THE ENGINEERING AND MINING JOURNAL.

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NOTE.—Communications relative to the editorial management should be addressed to Mr. ROTHWELL. The articles written by Mr. Raymond will be signed with a star.

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THE LATE COAL COMBINATION.

THE Coal Combination has succumbed to internal dissensions, and the newspapers generally are loud in their denunciations of the dead lion. We are congratulated upon the failure of a "bold and unscrupulous ring," a "tyrannical combination which sought to regulate production and prices without regard to the interests of either producers or consumers," and much more of the same class of nonsense. The facts in the case show no such tyranny on the part of the associated companies, and no such effects have resulted from its decrees as those attributed to them.

The Combination was its own worst enemy, and the direct cause of its failure was the impossibility to secure, among its members, that respect for the spirit of an agreement which should obtain among honorable men. The Lehigh Valley Railroad, though made the scapegoat in the resolutions dissolving the association, was by no means the only party that did not live up to its agreement. We have chronicled from week to week, throughout the present year, indications that more than one of the companies were not acting up to the spirit, even if they complied with the letter, of the Combination programme. These sharp practices, that we refrain from characterizing, should have found no place in the management of a great industry, under the control of such able and honorable gentlemen as the presidents of the associated companies.

This was the immediate cause of the failure of the association ; the ultimate causes were wider and deeper, and are of greater general interest ; to find them let us review briefly the history of this remarkable "trade union." Though there was no general knowledge of such a combination to regulate production before 1874, when this JOURNAL first published the official programme, yet the proportion which each company should contribute to the total quantity sent to tide water, seems to have been agreed upon as early as 1872. We have before us the official figures, giving each company's allotment, based on the quantity each had sent to market in 1871. No very strict rules were then in force, however, and the reason probably lay in the fact that coal sold very low, during that year, averaging at New York shipping ports barely $3.77 per ton, as compared with $4.81 in 1873, $5.26 in 1874, and $5.34 in 1875. There was, consequently, but little, if any, profit in the trade, and those who desired it were not prevented by any very strict rules from enjoying it.

In February, 1874, we published the first programme (see ENGINEERING AND MINING JOURNAL, Feb. 7, 1874, for full text of programme). This plan for the government of the trade distributed the tonnage to competitive points, as follows :

Philadelphia and Reading Railroad	25·85 per cent.
Lehigh Valley Railroad	15·98 " "
New Jersey Central Railroad Company	15·15 " "
Delaware and Hudson Canal	18·37 " "
Delaware, Lackawanna and Western Railroad	13·80 " "
Pennsylvania Coal Company	9·85 " "

The basis being 10,000,000 tons to competitive points ; the amount actually shipped to be regulated by the demands of the market. The programme prices agreed upon were to commence in March, at 15c. per ton above the opening prices of 1873, and thereafter to advance 5c. in April, 10c. in May and June, and 15c. in each of the months of July, August, September, October, and November, and that season prices should not be more than 30c. below the average of the year.

No commissions were to be allowed upon coal sold at yearly prices, and no contracts at yearly prices to be made with any one but consumers and retailers ; and then only upon certain conditions, intended to prevent others than the classes named from getting the benefit of yearly prices. No commissions exceeding 15c. per ton were to be allowed any one buying at regular monthly circular prices, and then only to such as purchased at least 25,000 tons per annum, etc.

As the prices charged for coal were very remunerative the inducements for securing trade by private concessions in price were too great to be always resisted, and there were consequently frequent complaints, though there was no open rupture between the companies. The system of yearly contracts with consumers and dealers and some other rules governing the trade were found to be insufficient, and in 1875 those adopted, though generally conforming to the programme of 1874, fixed prices at from 5 to 30 cents per ton above those of 1874, and increased these each month during the season. The yearly contract system was abolished, and instead of a commission of 15 cents per ton to middlemen, a commission varying from 2 to 3 per cent., according as the quantity purchased varied from 10,000 to 100,000 tons per annum was to be allowed.

This programme was still less satisfactory to middlemen than had been that of 1874, and it was also unpopular with large consumers. The increased profits, due to a considerable reduction of wages in all departments of mining and transportation and to the increased selling price of coal, offered temptations for obtaining trade at the sacrifice of the programme, and led to much shading of prices in underhand ways, and much recrimination among the members of the association.

In 1876 it was sought to hold the several parties up to the programme by an "iron-clad" agreement with penalties for offenders, and it was intended to give the *coup de grace* to the "middle interest" by allowing no commissions whatever on sales, and by dealing direct with consumers. There were to be three classes of prices :

1st. Contractors who made contracts prior to April 1, 1876, were to be charged twenty cents per ton less than regular circular rates.

2d. Season contracts were to be made with consumers of lump, steamer, broken, and chestnut coal, at prices fixed at the commencement of the season for each month, from March to December, inclusive.

3d. All other purchasers of coal were to pay circular rates, which were to be fixed about the 20th of each month, for the succeeding month.

The prices of coal were reduced an average of some 35 cents per ton from the prices of 1875, but as they were still very remunerative, and the amount of business to be done was diminishing, the inducements for doing it below circular rates, were again too great to be resisted ; and from the commencement of the year to the date of the dissolution of the Combination, offenses of this nature were of constant occurrence.

From this brief sketch of the principal points in the rules for the government of the trade, we perceive that the design of the Combination was—

1st. To regulate production, so as to keep the market supplied without overstocking it. 2d. To regulate prices, so as to maintain them at such a point as would allow the companies interested to earn the interest on their bonds, and a fair and moderate dividend upon their capital stock ; and 3d. To bring producers and consumers together, and do away altogether with the "go between," or "middleman."

That the heads of the late Combination are very sanguine gentlemen, must be admitted upon a consideration of this Utopian programme.

It is a very doubtful question whether an effective control of any commodity in general use can be maintained without the protection of patents or other legal enactments. Where there are substitutes in outside hands for the article, and where this is itself produced by a number of interests, it seems impossible that any combination to regulate production or prices can ever be long lived. The virtue of the average operator, or coal dealer, is not yet sufficient to cope with such temptation as high prices and business rivalries present.

The heads of the Associated Companies have constantly under estimated the extent of the depression in general business since the panic of 1873. And they appear to have based their programme, year after year, on an ill-founded anticipation of a prompt return of the "good times," and brisk business that would absorb constantly increasing quantities of anthracite, and that could afford to pay constantly increasing prices for the same. They ridiculed the idea that bituminous coal, being sold at lower prices, would take their market from them, and, under the impression that anthracite is a luxury that people *must have*, and under the spur of providing for enormous interest accounts, the prices of coal were maintained at figures which, though not absolutely exorbitant, were much higher than the requirements of general industry demanded.

Had the companies put the prices down to the lowest possible point, even at some sacrifice of dividends, they would have held that important part of their trade that went over to bituminous coal, and have maintained their production ; while the smaller margin for profit and the larger market for the coal would have offered less inducement for the underselling, which was the chief cause of dissolution.

The public generally have little reason to complain of the Combination, it has been, since the panic, the salvation of interests involving many millions of dollars. It afforded a steadiness to prices and a feeling of confidence which was of inestimable benefit during the season of uncertainty and gloom which has prevailed since 1873. It stood between the coal producing interests and financial ruin, as those can testify who recall the violent fluctuations in prices and their disastrous results in years previous to its organization. When it possessed the power to demand and obtain extravagant prices for its coal during the long-continued strike of 1875, no increase was made, as would undoubtedly have been done had there been no Combination. We gladly bear this testimony to the spirit of justice and moderation which character-

ized the government of the late association in its treatment of the public. It certainly was a public benefactor during its brief reign, though, as we think, it might have done more during the last year, both for itself and the public, by reducing still further the cost of coal. Its day of usefulness seems to have passed, and its dissolution will not now be attended with the serious dangers that would have followed it had it occurred two or three years ago.

We do not anticipate any bitter war between the companies. After the chagrin and irritation of failure have had time to soften, better counsel will prevail, and though there is not the least probability of a reorganization of the Combination—nor is such a thing to be desired—we have no doubt the several companies will live together on amicable terms, while each conducts its business in its own manner. We fear the auction sale of 500,000 tons advertised in another column, to take place on Tuesday next, will prove a mistake. There is no demand for such a quantity of coal, moderate though it be, and prices will probably go very low. The idea of its being prompted as a measure of retaliation on the offending companies is ridiculous, as is also the statement that "it is to afford the public an opportunity to name their own price for coal." It is understood that the Delaware, Lackawanna, and Western Railroad Company will continue to sell its coal at monthly auction sales as formerly, but it is not generally supposed that the other companies have been converted to this plan, or will pursue it hereafter.

There are many other questions connected with the combination and its history, and the effect of its dissolution on the coal trade, and on the general industry of the country, the consideration of which we must postpone. Our market reports will give, as usual, the fullest information on all points of practical interest to the trade.

A HIGHER "STANDARD" OF ILLUMINATING POWER IN THE GAS FRATERNITY.

WE always welcome with pleasure any indication of progress in the application of science to the useful arts, and to the adoption of a higher standard of scientific attainment for those who have charge of our great industries; but our satisfaction becomes much greater when we find that progress in an unexpected direction, and recognize it as the result of our own teaching. We beg to congratulate our conservative cotemporary, the *American Gas-Light Journal*, upon its unexpected effort to awaken the gas engineers to an appreciation of the requirements of the age. We need not say we heartily indorse the following sentiments, for they echo, even to the language, what we had ourselves said many months ago, but it is such an unusually bold statement for the organ of our Gas-Light Association, that we cannot refrain from giving it our cordial public endorsement.

"We do not hesitate to use the term Science of Gas Making, because the fact is becoming every day more and more prominent, that, wherever the business is conducted without regard to the scientific principles involved, it is becoming more and more unsatisfactory * * * there is a very general belief that gas bills are too high. * * * The natural expedient is to reduce cost of production, and, in many cases, the discharging of a few men, and perhaps, trying to get a little more out of the coal is considered sufficient effort in this direction. But this will not cure the evil. The remedy is too mild, and what is far worse, it is of the wrong character. The present excessive cost of manufacture is a brain difficulty, or a difficulty resulting from long disuse of the brain faculties. The rule of thumb has had too full a sway, and the time is coming when it must vanish, or profits will dwindle, from the fact that extravagance and want of knowledge are most often traveling companions.

"The true remedy is to reduce the practice of gas-making to a true scientific basis. By this we do not mean a theoretical basis, but a practical working one, founded upon correct scientific principles. * * * The best possible apparatus, a good library of the best books, *well used* and a hearty co-operation with each other, will place the profession where it should be, and enable them to take the lead in giving gas at lower rates, instead of being obliged to follow the 'cry,' which is ever likely to become extreme and unreasonable, if not controlled."

Courage, Confrère, courage, ce n'est que le premier pas qui coute. Keep on and you may not have the satisfaction of raising the standard of gas manager enlightenment. There are signs of the growing influence exerted by the comparatively small number of our educated, progressive, scientific managers who appreciate the requirements of the times, and are endeavoring to make radical and important improvements on those venerable methods of gas manufacture in use fifty years ago; the majority of the fraternity, however, still cling to the traditions of the past with a simple faith, that, if exercised in another direction, would surely merit a glorious reward.

The spirit of the age is progress, and the public, "our patrons," are loudly calling for that cheaper gas which our candid contemporary assures them could be provided, were a higher standard of scientific attainment required in the management of our gas works. So long as this admitted cause of excessive cost obtains, the public cannot but regard the unnecessarily high price of gas simply as a tax to provide a sinking fund for ignorance.

We recognize the courage required on the part of our contemporary in making these bold and progressive statements, so unpalatable to many of its readers, who still live in the distant past, and we suppose it was to conciliate these, and antidote this violent dose of progress that we find recorded as the latest news in its market reports the following:

"Within the last week, contracts have been made by some of the companies in New York, for about 200,000 tons of Penn, Westmoreland, Waverly, Youghiogheny, and the West Virginia caking coals, at $6 per ton, a reduction of 50 cents from last year's prices."

An item of news that appeared originally in the ENGINEERING & MINING JOURNAL, February 5, 1876. But even this is encouraging, and if our friend keeps on he may in time bring the gas companies up as near the present state of scientific knowledge as he would have them in regard to the selling price of coal.

CREDNER VS. BROOKS.

THE letter of Major T. B. BROOKS, published in another column, in reply to the complaint of Dr. CREDNER, shows how unfortunate it is that men of ability and honor should be led by personal pride to avoid frankness. It appears that Major BROOKS has considered himself, for some years, as wronged by the omission of Dr. CREDNER to give him due credit in a certain matter; that he preserved a dignified silence on the subject until at last in a "time, place, and form" which he admits may not have been "the best," he "called Dr. CREDNER to account for want of fairness," by the somewhat barbaric method of striking back. Even under the sting of this unexpected attack, Dr. CREDNER's statement in reply contains all the credit to Major BROOKS which the latter demanded. It is evident therefore, that he might have obtained redress at any time by milder means. Dr. CREDNER seems to have been left in entire ignorance of the feelings of Major BROOKS; and while it is undeniable that he owed the acknowledgment now given, it does not follow by any means that he is the man to blame. It is the duty of every scientific writer to give due credit to those who assist him in his work; but this may be omitted through a hundred causes, not connected with a malicious or dishonest intent; and it is equally—nay, still more emphatically—the duty of the party injured to assume that the wrong was unintentional, and give opportunity for reparation. Standing off in dignified silence, nursing the sense of injustice suffered, and then breaking out with a revenge both late and sudden, is as unwise as it is unworthy. Major BROOKS will be sincerely sorry to discover that he has put himself in such a position; but it is nevertheless true that, to the eye of an impartial observer, Dr. CREDNER having thoughtlessly deprived him of the credit of certain geological observations, he deliberately, in his own mind, deprived Dr. CREDNER of the credit of common honesty—and we hold the latter offence to be worse than the former.

Moreover, it must be said that Major BROOKS spoke very darkly for one who waited so long before speaking at all. The words which he now adds in italics have the double effect of withdrawing the attack made in his original footnote, and of substituting his real complaint, which he certainly did not clearly express before. In reading that note, we did not dream that the grievance of Major BROOKS was what it now appears to be, or indeed, that he had any grievance. The note would have been equally appropriate, if Dr. CREDNER had given him ample credit for his "rough section." It consisted of a statement that Dr. CREDNER had based certain erroneous conclusions largely on that section; and it was offensive merely because it intimated the absence of independent investigations on CREDNER's part. This offensive intimation is now disclaimed, so far as a very large portion of the Archæan rocks of Lake Superior is concerned.

The way is thus opened for more important questions. If Dr. CREDNER came to wrong conclusions from Major BROOKS's section of one district, coupled with his own researches in that and other districts, what was the fault in his reasoning? His own observations are not called in question, so far; Major BROOKS's footnote leaves (perhaps unintentionally) the impression that the "rough section" itself was somehow incorrect. The fact is, that in trying to do too many things with that unfortunate footnote he accomplished nothing clearly. If it were not too absurd, one might be tempted to suppose that he was fighting for the glory of having misled Dr. CREDNER.

To sum up the matter, Major BROOKS had cause for complaint. How slight it was, appears from his own confession that he has it no longer—had lost it, indeed, before he had fairly stated it. Dr. CREDNER also has had cause for complaint. We do not doubt that he will stand by the frank acknowledgment which he has now made of Major BROOKS's section and apologise for whatever omission he has been guilty of, heretofore. That being done, it will be quite in order for Major BROOKS to confess the deeper injustice of uncharitable judgment—after which, we humbly trust, it will be the turn of the public to see two friendly and chivalric champions put lance in rest, not for private wrongs but for the "joyous tourney" of science.

*

THE LOWE GAS PROCESS AT THE PHILADELPHIA GAS WORKS.

THIS method, which has received occasional notices in these columns, has the merit of achieving greater successes with each new appearance. The excellent results accomplished by it during some nine months' trial in the city of Utica, an account of which was published in reports by Prof. H. WURTZ (See ENGINEERING AND MINING JOURNAL, Vol. XX., p. 502) and H. H. FISH, the manager of the Utica Gas-light Company, were attracting very general attention when its operations were brought to a standstill by a fire that destroyed the wooden building in which the works were located. Nothing daunted by this disappointment, the owners sought for an opportunity to demonstrate their system on a still larger and more conclusive scale, and were so fortunate as to make arrangements with the Philadelphia Gas Trust, for a trial of it at their Manayunk Station. The new process has recently "blown in" there, and it is pleasant to state that the results are most gratifying and show already a decided advance in some particulars over those obtained at Utica. The generators, of which there are three, are 40 inches in diameter, instead of 30 inches as before. To each of these there are two—instead of one as formerly—of the stacks, called superheaters, filled with loose fire-brick. The products of combustion are divided between these, and when heated up sufficiently one serves, as formerly, for the thorough fixing of the gases; the other, to superheat the steam before its entrance to the base of the coal chamber.

This is a new feature, suggested by the excess of heat evolved by the apparatus at Utica, which is thus, in a most simple manner, utilized with great advantage. The temperature attained by a jet of steam passing down through a column of fire-bricks 15 feet high and 30 inches in diameter, standing at a white heat, is enormous and has produced surprising results. The increased facility of generation was immediately noticed, the delivery of gas, instead of 3,000 feet, which was considered a good result at Utica, at once attained 8,000 feet to a run of thirty minutes in one generator. Two days later, over 10,000 feet were run, and on the 10th inst. 13,400 feet. What the limit of capacity may be, will only be developed by increasing familiarity with the new works. It seems also that the high temperatures tend to reduce the proportion of carbonic acid in the gas, thus simplifying its purificati The Lowe process is apparently entitled to take its place among the useful arts of civilization, and we hope it may effect the permanent improvement and cheapening of light, and let us also hope it may be successfully applied to the economical production of heating gas. It certainly furnishes a striking illustration of the persistency of inventive men, for the attempt to make "water gas" practically and economically, dates back to an early year in the century, and the present success has been won only after many failures and disappointments. We look upon the practical solution of the water gas question as a most important matter for metallurgical science, and we hope this successful application of this interesting process will be thoroughly investigated by competent experts. We would suggest to the owners, as a sure way of obtaining the general recognition of what is of value in this process, an examination, by, say, three experts, two of whom they might request the Institute of Mining Engineers and the Gas-light Association to appoint.

INTERNATIONAL EXHIBITION OF 1876.

Special Report of the Engineering and Mining Journal.

ADMISSIONS FOR THE WEEK ENDING AUGUST 22, 1876.

Date.		Paying Visitors.	Press, Complimentary, and Exhibitors.	Total Visitors.
Previously reported.....	.....	2,037,851	867,667	2,905,518
August 16	85th Day..	28,460	7 755	36,215
" 17	86th " ..	27,197	7 441	34 638
" 18	87th " ..	25 789	7,802	33 591
" 19.....	88th " ..	*54,045	9.604	63,649
" 21.....	89th " ..	28 981	8,522	37 503
" 22.....	90th " ..	32,027	7,823	39,850
Totals.....		2,234,350	916,614	3,150,964

* Admission 25 cents.

EXPLOSION IN THE BLACK DIAMOND COAL MINE, CALIFORNIA.

Special Correspondence of the Engineering and Mining Journal.

TO THE EDITOR—SIR: Having just returned from a trip to the Mount Diablo Coal Mines, where I took pains to investigate as fully as possible the circumstances attending the explosion of July 24th, in the Black Diamond Mine, which has finally resulted in the death of eleven men, I wish to state a few general facts regarding that explosion, and then ask for information on one or two points through your columns, from mining engineers and superintendents in the Eastern States, who have had much experience in the working of "fiery" coal-beds.

It is the general belief among the miners at the locality where this explosion happened, that the flame having been first kindled by the flash of a blast in the coal, was then propagated so far as it extended through the works, merely by the *coal dust*, which was floating in the air, without the presence of any inflammable gas.

But I consider it very questionable, whether the densest cloud of coal dust that ever occurs in the mines is capable, *per se*, and without the presence or aid of any gas, of catching fire, and flashing like a gas from the flame of a lamp or blast. But, however this may be, it is certain that far denser clouds of dust than could possibly have existed throughout the space where the flame extended along the face of the works in this explosion, are very often seen in other parts of the mine, and are traveled through by the men with naked lights, and *do not* take fire from the flame of the lamp.

Furthermore, on inquiring carefully into the details of the condition of things as they existed immediately after the accident, or as soon as the after-damp had cleared away enough to permit access to the locality, I find in the character of the effects which the explosion produced, as well as in numerous circumstances which attended it, but which I have not time to describe here, the most convincing evidence that it was *fire damp* and *not* coal dust, which was effective in propagating the flame of the explosion.

Yet there is a mystery about it. It is certain that in addition to the blast itself, a tin half gallon can containing powder was exploded, and there is, furthermore, every probability that a nearly full *keg*, containing probably 20 lb. or more of blasting powder, was also exploded. But this last is not absolutely certain. In any case the flame had to travel from the blast which produced the explosion some 75 or 80 feet in order to reach the half gallon can which exploded, while in order to reach the keg which probably exploded, it had to turn two right angles in its course, and travel a distance of between 90 and 100 feet. But men were *burned* and killed in this explosion in localities where it was impossible for them to be either killed or burned by any direct action of the powder flame, and while thin board brattices between them and the powder were not blown down.

But the mystery is this, though there is a little fire damp almost everywhere in the bed in which this accident occurred, its quantity in presence of good ventilation, has never been sufficient to necessitate the use of safety lamps, except as an occasional means of testing the presence of the gas in certain localities where it was possible for small quantities of it to accumulate. And there was *no* opportunity for any appreciable quantity of it to gradually collect at the locality where this explosion occurred; for the ventilation here was good and thorough, and immediately before the firing of the blast, which was with hardly a possibility of doubt, the occasion of the explosion, the men had been working all along the face of the coal there with lights. Moreover, the occurrence of strong and powerful "blowers," which are capable of suddenly bursting out and discharging large quantities of fire damp in a few seconds or minutes, is a thing never yet heard of in these mines.

How was it possible, then, for so large a body of fire damp as must apparently have been involved in this explosion, to so suddenly make its appearance here? I can think of but two hypotheses which seem capable of accounting intelligibly for all the known facts of this explosion; the first is the supposition that the mere *concussion* of a heavy blast in a fiery bed is capable of almost instantaneously forcing in some way from numberless minute crevices all along the adjacent face of the coal, a quantity of fire damp which in the aggregate is considerable, and which makes its appearance quietly enough to catch fire from the flash of the same blast which forces it out.

And yet I never heard of such a thing before, and therefore I wish to ask of engineers and others who have experience in fiery mines whether they have ever noticed facts which would point to such a conclusion. It is evident that if this be the true explanation of the Black Diamond explosion, nothing could be more dangerous than the use of powder in a fiery mine.

Secondly, it occurs to me that it may be possible that a mixture of fire damp and air, which contains too small a percentage of fire damp either to be explosive, or to be capable of taking fire from the small and quiet flame of an ordinary miners' lamp, may, nevertheless, be capable of taking fire and burning to a greater or less extent from the far fiercer and more intense flash of a heavy blast.

I shall be thankful for any information derived from known facts on these points. G.

SAN FRANCISCO, Cal., August 8, 1876.

ON THE DETERMINATION OF CARBON IN IRON.*

By V. Eggertz.

TWELVE years ago I described two different methods for the determination of the chemically-combined carbon in iron. The graphite is determined in the residue left by dissolving the iron in acid, in which process the chemically-combined carbon escapes in a gaseous state.

According to the first of these methods, the iron is dissolved in iodine, by which treatment the carbon forms an insoluble† compound with the iodine and water, which is stable at 100 deg. C., and has the composition $C_8 + 2OH^2O$, containing 60 per cent. carbon. This precipitate is collected on a filter which has been dried and accurately weighed, at a temperature of 100 deg. C., washed with warm, dilute hydrochloric acid, and then with water, dried and weighed. The amount of carbon is then calculated from its weight. If the iron contains graphite, this, after having been specially determined, must be subtracted from the weight obtained.

The second method for determining the combined carbon is colorimetric, and consists in dissolving the iron in nitric acid, the brown color of the solution becoming darker in proportion to the increased amount of carbon present. The amount of carbon in the iron is calculated from the volume of the solution, which, by dilution, gives a color precisely like that of a normal solution whose percentage of carbon is known.

In *Fern-Kontorets Annalen* for 1874, No. 3, Dr. TAMM says, "from the experiments described it appears that the most accurate results for the determination of carbon in iron, are obtained by the direct combustion in oxygen." With respect to the iodine method, Dr. TAMM says, that where it is carried out carefully and with certain precautions it gives results "which approach correctness." On account of the great advantages offered by this method over the combustion process, in not requiring special apparatus, or greater experience or skill on the part of the investigator than is needed in ordinary metallurgico-chemical examinations.

With respect to the iodine method there must be observed:

(1) Slow solution of the iron. The plan now followed is to scatter the pulverized iron over the surface of the solutiod and allow it to sink before stirring the solution with a glass rod.

(2) Most careful drying and weighing of the filter and carbonaceous residue.

(3) A correction for the solubility of the filter in heated dilute hydrochloric acid, in case the soluble ingredients have not been previously extracted, or platinum filters are not used, as is at present the case at the Swedish School of Mines.

With regard to the calorimetric determinations there must be observed:—

(1) That in the solution of the iron in nitric acid on the water-bath at a temperature of 80 deg. C., the vessel in which the solution takes place must not be exposed to too dazzling daylight, and must be removed from the water-bath as soon as the solution is accomplished.

(2) After removal from the water-bath the solution should not be unnecessarily exposed to strong daylight. Such a solution retains its color unchanged, in the dark, for many days. In ordinary daylight it changes color in less than an hour, and in strong sunlight in the course of a few minutes.

(3) That normal steels must be used whose carbon has been accurately determined, and burrettes of precisely similar glass,

* *Berg- und Hüttenmännischen Zeitung.* Translated for the *American Chemist.*

† This compound can be regarded as insoluble, as only small and easily washed compounds are obtained in the carbon determination of iron. On the other hand, the washing of larger quantities is very tedious, and possibly induces a change in the nature of the compound. It may be that the same conditions occur as in the phosphorus determination of iron by the ammonium-molybdate process. As I showed, in my article in the *Berg- und Hüttenmännischen Zeitung*, 1860, page 412, slight precipitates, always possessing the same composition, can be easily washed, and the amount of phosphorus is quickly and accurately determined by a direct weighing of the precipitate. For heavy precipitates, on the contrary, which require a long time to wash them, this process may be less suitable. It has been found that one gramme of the precipitate is not too large a quantity for direct weighings. A uniform composition of the precipitate is attained by always following a uniform method. There is danger of precipitating molybdic acid if the solution be heated at a temperature of 40 deg. C. for more than six hours.

GOLD EXHIBITS AT THE PHILADELPHIA EXHIBITION.

Special Correspondence of the Engineering and Mining Journal.

VICTORIA, AUSTRALIA.

THE honor of having made the first discovery of deposits of the two most valuable metals yet worked in Australia, is due to the same person. Rev. W. B. CLARKE, who was mentioned in a former article—on the tin deposits of Australia—as having been the first one who noted the presence of that metal in New South Wales, discovered gold in 1841, in the mountainous region to the west of the Vale of Clwyd in New South Wales.

This discovery, although brought to the attention of the Governor-General in 1844, who was shown specimens of gold in quartz, by Mr. CLARKE, did not excite any special interest; which fact is due, in some degree, to the not uncommon discovery of precious metals by explorers, in places where paying quantities do not exist, and also on account of the then large convict portion of the inhabitants, whose presence tended to discourage enterprize of any kind in the colonies.

The next discovery of gold seems to have been made by a man named W. CAMPBELL, who, finding it at Clunes, in Victoria, in March, 1850, did not report the discovery for fear, as he said, of injuring the prospects of the squatter on whose run the gold was found.

The first real impulse was given to gold discovery in 1851 by a man named E. A. HARGREAVES, who, during the previous year, had returned from the California gold fields for the express purpose of finding the same metal in Australia. His memory had led him to recognize the identity of character of the gold-bearing districts of both countries. On the 12th of February, 1851, he found placer gold in the bed of Summer Hill Creek, in New South Wales.

From this time gold discovery became rapid. In New South Wales Dr. G. BRUHN found gold in quartz, two miles from Parker's Station; and on the 8th of August, in the same year (1851) THOMAS HISCOCK discovered it at Bunneagong, which led to the opening of the celebrated Ballarat gold fields. The usual excitement followed these preliminary discoveries. Crowds of emigrants from Great Britain and America, and even from China, came to the gold districts to engage in placer mining. The production of gold rapidly increased, so that with the amount which California was then producing, some political economists were led to believe that gold would lose much of its purchasing value. The maximum production was soon reached, however, in both countries, and no material change took place in the value. During the last three months of 1851, 145,146 ounces of gold were obtained in Victoria, and this proportionate yield was largely increased in 1852, when 2,218,782 ounces were mined. In 1856 the largest amount of gold mined in Victoria, in any year, was reached, the yield being 2,985,991 ounces. The gold first obtained was entirely from washings, and was in the form of dust or nuggets, without any attached matrix. In fact, so rarely was the gold found in quartz, that specimens in which gold occurred intermingled with rock, and which, intrinsically, were only worth a few shillings, sold as curiosities, at prices ranging from $50 to $75 a piece. Finally, miners discovered rich lodes cropping out at the surface, in which the gold was to be seen in such quantity as to tempt them to break off pieces, crush them with hammers, and then extract the gold by washing, or amalgamation. In this rude way some men were able to extract from thirty to fifty dollars' worth of gold per week, the amount obtained being but a small part of that which the rock contained, owing to the very rude method of extraction employed. Gradually the introduction of stamp mills and amalgamating apparatus took place, many new gold-bearing lodes were discovered, and the working of quartz ores became a fixed industry. In 1863, out of a total production of 1,626,872 ounces of gold in Victoria, 493,499 ounces were estimated to have being produced from quartz crushing. The yield from these quartz lodes is steadily increasing the amount produced in 1874 in Victoria, being 599,028 ounces, out of a total production of 1,155,791 ounces. The following table shows the production of gold in Victoria from 1851 to 1871, inclusive:

Year.	Amount Exported.	Value.	Mean Average per Man employed.
	Oz.	£	£ s. d.
1851, 3 months	145,146	580,584	30 1 7·60
1852	2,218,782	8,875,128	262 11 6·66
1853	2,676,345	10,705,380	202 15 ·81
1854	2,150,730	8,602,920	130 16 4·08
1855	2,751,535	11,006,140	100 7 2·75
1856	2,985,991	11,943,964	103 11 0
1857	2 762,460	11,049,840	83 7 9·59
1858	2,528,478	10,113 912	68 12 8·39
1859	2,280,950	9,124,800	72 10 11·27
1860	2,156,620	8,626,640	79 9 3
1861	1,967.420	7,869 680	74 15 11
1862	1 658,207	6,632,828	67 14 5·11
1863	1,626,872	6,507,488	70 9 0·42
1864	2,544,694	6,178,776	74 1 9·29
1865	1,543,801	6,175,204	74 4 2·09
1866	1,479,194	5,916,776	
1867	1,433,187	5,733,748	
1868	1,657,498	6,629,992	
1869	1,340,838	5,363 252	
1870	1,222,798	4,891.192	
1871	1 355,477	5,421,908	
1872, 9 months	881,269	3,524 836	

From 1851 to 1858, inclusive, the production per head is divided between all at gold fields, and from that time all actually engaged in gold mining.

In addition to amounts of gold given in the table, it is said by the Register-General of Victoria, that 1,267,241 ounces of gold, which were produced in the years 1851, 1852, 1853, 1854, and 1855, were shipped to New South Wales, and, consequently, should be added to above tables. From an analysis which has been made of the yield of placer and quartz mining, it is shown that in 1866 the gold, per man, in the alluvial diggings, amounted to £66 16/3, and in quartz mining, to £101 10/5½ per man. From information which had been obtained up to 1866, about 3,110,328 tons of quartz, which were crushed, yielded an average of 12 dwts. 6.374 grns., and the price per ton for crushing ranged from £2 6/ to £1 10/.

The amount of wash dirt treated by puddling or sluicing in 1874, has been computed as amounting to 1,037,345 tons, which yielded 54,725 ozs. 18 dwt. of gold, or an average of 1 dwt. 1·32 grains per ton. The auriferous cements mined and crushed is estimated at 85,010 tons for the same year. The yield of gold from this source amounted to 8,789 ozs. 9 dwt. 8 grains, or 2 dwt. 1·62 grains per ton of cement. The total amount which is known to have been taken from all the districts up to 1875, is 45,629,122 ozs., having a value of $875,508,780.

Hanging on the walls of the Victorian Court, in the Main Building, are several geological maps and cross sections of mineral districts in that country. One of these represents the Ballarat Gold Fields. The space included in this map is about fifteen miles from north to south, and ten miles from east to west. Running through the center of this territory from north to south is a range of broken hills, near the middle of which is located Ballarat East. The rocks of which these hills are composed belongs to the Lower Silurian measures. The valleys in these hills are filled with pliocene formations, and in a few places with older drifts containing gold. Nearly all these drift deposits contained gold, and in them, at one time, were the principal alluvial workings of the district. On either side of these Silurian hills the country is covered with volcanic formations; a large mass of granite to the north-east of Ballarat occurring between the Silurian rocks and the volcanic formation. Several other masses of granite are on the same side of the Ballarat Hills. Gold has been found in some of the recent surface deposits on the volcanic rocks, but now the most profitable workings are those which are found inclosed between different beds of basalt which have successively covered the washings from decomposed auriferous quartz veins. These underground workings have, in many mines, been carried to considerable depths and distances. The main tunnels, or drives, as they are locally called, have been driven through the alluvial workings in several mines for distances of from 4,000 to 6,000 feet. As late as 1872 the depths at which the levels have been worked, varied from 50 to 500 feet.

The alluvial beds or gutters in which gold has been found, have been nearly exhausted by mining, and the workings which are now carried on are mostly confined to the careful re-working of some neglected portions, and also in small tributary gutters and what is called reef washes. These reef washes, which often contain considerable quantities of gold dust, were formed in these ancient stream beds from auriferous or non-auriferous quartz veins which had been inclosed in the softer Silurian slates or schists, and which quartz veins had, by their superior hardness, resisted erosive action enough to form natural reefs or riffles, which have caught and held the gold. These reefs cross these ancient stream beds at all angles, and are sometimes parallel with them. When prospecting for these reef washes, if a seam of slate inclosing a quartz vein is penetrated, a "jump up" is immediately constructed, so as to reach the cap of the reef, after which the adjoining surface deposits are carefully examined for gold. Considerable difficulty is sometimes experienced in finding the washings, owing to their being surrounded by dense clay banks.

The appearance of the wash dirt varies considerably in different reefs. Some are of a loose, sandy nature, with dark colored pay dirt, while others are light colored, the wash containing large boulders and lumps of clay. The "bottoms" are sometimes sandstone, and sometimes a soft pipe-clay. Vegetable remains are often found in the reef wash.

From what has already been discovered with regard to these alluvial deposits, it seems probable that a long stretch of country, lying to the west of Ballarat, will, at some time, be found to contain rich beds of pay dirt.

The yield of gold from these deep alluvial beds has been found to vary from 11·80 grains to 2 dwts. 1·82 grains per ton of wash dirt. These comparatively low values per ton make the most careful management necessary, in order to work the mines with profit. The gold found is generally very fine, assaying over 23 carats. Reports made by thirteen of the principal alluvial gold working companies of Ballarat show that since their commencement to September 30, 1872, they had won £4,626,753 of gold in value, of which £1,886,230 have been paid in dividends. The quartz veins, or reefs, which have been discovered and worked in the Ballarat District, are nearly all located in the Silurian hills, between Ballarat East and West, and under the volcanic rock which joins the western edge of these hills.

A few veins have been found east of Ballarat, and quite a number in the district covered by volcanic rock north of Ballarat West. The directions which these lodes follow is very irregular. In general, however, they have a north and south direction, with numerous branches, or leaders, which bear off at various angles. What is called the Caledonia lead is found under the volcanic rock west of the Ballarat Hills. It runs nearly north and south, until between Ballarat East and Ballarat West, when it takes a short turn and runs to the north-east through the Silurian hills. Most of the shafts which had been sunk on these reefs up to as late as 1872, were not more than three to four hundred feet in depth, but since then they have been carried much deeper. As a rule, the gold found per ton of quartz is less as the depth increases, but frequently the veins widen out, so that the yield of gold is increased.

A map, which is exhibited, of the Sandhurst Gold District, shows that nearly all the leads which have been discovered there are found in a trapezoidal area about 3 miles in width, and 7½ miles long, north and south, the town of Sandhurst being situated to the east and south of the center of this area. The country, which is hilly, is composed of Lower Silurian rocks. The strike of nearly all the lodes is slightly west of north.

The quartz veins in these Silurian rocks are sometimes associated with lava streaks or dykes, which frequently have faulted them to a considerable extent. The wall rock to the quartz vein is very frequently a fine-grained sandstone, sometimes associated with slate, and containing mica and iron pyrites. In 1872 the deepest shaft in this district was 801 feet, but since then greater depths have been reached. The dip of the quartz vein is nearly vertical in most of the mines. In one mine, however, the quartz lies horizontally, as a succession of spurs imbedded in sandstone, afterwards rising to the east at an angle of 45°, through slate. Saddle reefs or veins are also found, in which the reef dips in opposite directions and is thickest at the top.

Many leaders or small veins lying alongside the main vein are characteristic of some of the Ballarat Mines. These leaders are sometimes found to join the main vein after being worked to some depth. Reports which were obtained from twenty-one mines around Ballarat, show that up to 1872 they had crushed, in the aggregate, 777,868 tons of quartz, which yielded 139,540 ozs. 1 dwt. 19 grains of gold, or an average per ton of 3 dwt. 15·1 grains.

One of the finest exhibits of rich gold quartz is made by the Acadia Catherine Mine, near Sandhurst. The specimens, which cover a space of about 6 square feet, are exhibited in a separate case at the front of the Victorian Court. The quartz in which the gold is found is a nearly white amorphous variety. Imbedded in it the gold occurs sometimes in filigrees and foliated plates, and again as solid, irregular shaped masses. Small amounts of galena and iron pyrites are imbedded in the quartz, and gold is to be seen mixed with these minerals. No assay is given of the value of these specimens. The mine from which they come has been worked for a number of years without yielding much value, but quite recently rich developments have been made, the specimens shown giving substantial proof of the fact.

THE ARCHÆAN ROCKS OF LAKE SUPERIOR—LETTER FROM MAJOR BROOKS.

PORTOBELLO, SCOTLAND, July 28, 1876.

TO THE EDITOR: SIR—In the ENGINEERING AND MINING JOURNAL of June 17, which has but just reached me, is a letter from Dr. CREDNER, complaining of the manner in which I referred to his work in the *American Journal of Science*, for March last.

I cannot—perhaps unfortunately—claim that the paragraph referred to, does not express, so far as it goes, what I desired to say. I will here repeat the essential parts, adding in italics what now seems necessary to make it perfectly clear, as well as to understand what follows:

"Dr. H. CREDNER regarded the entire Marquette series as the equivalent of the lowest member * * * * of the Menominee Huronian. * * * He seems to have based this geognostic reasoning largely, *so far as the Marquette series were concerned*, on a rough section of the Negaunee District, which I sketched for him (and which he has reproduced *both in his paper referred to, and afterwards in his treatise on geology without essential alteration, and without acknowledgment*). * * *

I do not conceive that the first group of italized words were at all necessary to a perfect understanding of my meaning. I was criticising Dr. CREDNER on but a single point, *i.e.* his hypothesis of equivalency between the rocks of the two districts, to institute which it was necessary for him to have not only a knowledge of the Menominee rocks, but also of the Negaunee series, as to their nature, sequence, foldings, thickness, etc., and this information was far more important than the studies of remote Archæan regions to which he refers.

Had Dr. CREDNER given me the same credit in his paper for adding to his knowledge of the Negaunee rocks, which he has in his letter, this correspondence would not have occurred; nor does the fact that he "fully improved his opportunities of verifying my rough section" seem to me to warrant any such omission of ordinary courtesy.

This "rough section," with all its imperfections, embraced the entire Negaunee series of rocks down to the Laurentian, and was the result and summary of a study of the Negaunee District alone, which occupied twice as much time as Dr. CREDNER spent on the entire Upper Peninsula, nearly all of which he devoted, according to his statement, to the Menominee region. To give an idea of the thoroughness of a part of the work, I may say that ALEXIS A. JULIEN assisted me for a time in the survey.

Looking back on the results from my present more comprehensive standpoint, and in a less modest frame of mind, I do not hesitate to say that I believe that the structure of no equal area of such complicated Archæan rocks, had been as well worked out in the United States at that time.

There is, perhaps, no field of investigation in which one is able to formulate the results of laborious and expensive study like stratigraphical geology, especially of the metamorphic rocks. A rough section with a few explanations may "boil down" months, or even years of hard work. For example: from a few rough sections of the Menominee region, Professor PUMPELLY made me acquainted with the gist of the results of the joint labors of both himself and Dr. CREDNER, long before the publication of the elaborate paper of the latter gentleman, which first gave to the world those valuable results.

My reasons for supposing that Dr. CREDNER did not make any such scientific verification of my "rough section," as would entitle him to regard his as an independent work, were:

1. I did not believe he considered it necessary. I explained my work fully to him, and conducted him to some convenient localities, when a few of the hundreds of facts which it summarized could be observed, thus giving him incidentally an opportunity to judge of my ability as an observer.

2. I did not believe he had time, money, or opportunity, to engage on a work which was but remote connected with the exploration on which he was employed.

3. If he had determined on a somewhat thorough examination of the Negaunee District, why did he not call upon me for such aid and suggestions as he well knew I would have gladly furnished, and which help he must have known would have reduced his labor ten-fold?

Lastly, I cannot possibly understand why he concealed the results of such examination from his superior Prof. PUMPELLY. That he did so, I infer from the fact that the latter gentleman, after the appearance of Dr. CREDNER's paper, and before I had published anything, gave me the fullest credit both in conversation and letters, for being the first and only person who had at that time, "unraveled the tangled skein" (these were his words in a letter, as I remember them) of the Marquette rocks. This was more credit than I was entitled to, particularly as no small aid came from him directly and indirectly.

That Dr. CREDNER made several valuable studies of localities, and certain strata in the Negaunee District, which presented very interesting phenomena of sequence, folding faulting dykes, etc., is evident from his publications; but that these enabled him to construct, or even verify, my complete "rough section," I cannot conceive. At least they all figured in his publications, as I remember them, in quite subordinate positions compared to my general section.

I may not have chosen the best time, place, and form, of calling Dr. CREDNER to account for his want of firmness, but I conceive no one will question my having cause for complaint on the above full statement of the case which I am now forced to make, but which I have endeavored to present fairly. That I have no desire to do him injustice, or withhold from him all credit to which he is entitled for his valuable work in the *Archæan* of the North-West, is indicated by the fact that I have repeatedly given Dr. CREDNER both general and specific mention when opportunity offered—more frequently, perhaps, than any one else in our country—of which fact he seems to be aware.

Very respectfully yours,

T. B. BROOKS.

THE STAR OIL WELLS are situated about fifteen miles from the San Fernando Tunnel, in Pico Cañon, California, in one of the wildest and rockiest passes of the mountains, the road for three or four miles being so crooked that one can hardly see one hundred feet ahead, the partially dry creek winding in and out like a snake, the whole way up the gorge. This company has lately commenced to bore new wells with fine prospects, while, at the same time, they are gradually sinking the others to a greater depth; one well, which they are now deepening, was originally bored to a depth of 125 feet, and there a flow of oil was struck which yielded about ten to twenty barrels a day. There are also two more wells which make the total amount of oil got out about forty barrels per day. The company are steadily getting the wells to a lower strata of rock, and expect soon to be able to supply the whole State with as fine illuminating oil as the best petroleum of Pennsylvania, and in a short time will doubtless be running fully 100 barrels of refined oil a day. They have completed their new still for refining, and are already able to take care of forty barrels of crude oil every day. There is already about a mile and a half of pipe laid from the wells down the cañon. They intend to lay the pipe all the way from the well to the efinery, which is about nine miles.

BISMUTH ALLOYS.

As a useful addition to an article on page 582, Vol. xxi. of ENGINEERING AND MINING JOURNAL, we append, the following an extract from *Guettier's Metallic Alloys*, concerning bismuth alloys:

Alloys of Bismuth and Copper.—These alloys are easily effected, notwithstanding the difference in the points of fusion of the two metals. They are brittle, and of a pale red color, whatever the proportions employed. The specific gravity of the alloys is sensibly equal to the average of the two metals.

Alloys of Bismuth and Zinc.—These alloys are seldom made, and produce a metal more brittle, presenting a larger crystallization, with less adherence, than zinc or bismuth taken singly. On that account they are useless in the arts.

Alloys of Bismuth and Tin.—The combinations of bismuth and tin take place easily, and in all proportions. A very small quantity of bismuth imparts to tin more hardness, sonorousness, luster, and fusibility. On that account, and for certain applications, a little bismuth is added to tin in order to increase its hardness. However, bismuth being easily oxidized, and often containing arsenic, the alloys of tin and bismuth would be dangerous for the manufacture of certain domestic implements, such as culinary vessels, pots, etc.

The alloys of bismuth and tin are more fusible than each of the metals taken separately.

An alloy of equal parts of the two metals is fusible, according to several authors who disagree, at a temperature varying from 100° to 150° Centigrade. These differences are evidently due to an incorrect measuring of the temperature, or to the temperature being taken after the proper time of fusion.

When tin is alloyed with as little as 5 per cent. of bismuth, its oxide acquires the peculiar yellowish-gray color of the bismuth oxide.

According to RUDBERG, melted bismuth begins to solidify at 264°, and tin at 288°. For the alloys of the two metals the "constant point" is 143° C.

Alloys of Bismuth and Lead.—These two metals are immediately alloyed by simple fusion, with merely the ordinary precautions. The alloys are malleable and ductile as long as the proportion of bismuth does not exceed that of lead; they are also much more tenacious than lead.

The alloy of bismuth 2 and lead 3 parts is about ten times harder than pure lead.

The compounds of bismuth and lead generally have a dark gray color, with a tint intermediate between the color of tin and that of lead. Their fracture is lamellar, and their specific gravity greater than the mean specific gravity of either metal taken singly.

An alloy of equal parts of bismuth and lead has a specific gravity equal to 10·71. It is white, lustrous, sensibly harder than lead, and more malleable. The ductility and malleability diminish with an increased proportion of bismuth, while they increase with the excess of lead in the alloy.

An alloy of bismuth 1 and lead 2 is very ductile, and may be laminated into thin sheets without cracks. BERTHIER says its point of fusion is 166° C.

According to RUDBERG, melted lead beginning to solidify at 325°, the "constant point" for the alloy of the two metals is 129° C.

Alloys of Bismuth and Iron.—The learned disagree as to the possibility of combining bismuth and iron. Up to the present day, the combinations indicated are rather doubtful.

At all events, the principal fact is, that the presence of bismuth in iron tends to render this metal brittle, and is not an improvement in its manufacture.

Alloys of Bismuth and Antimony.—These alloys are grayish, brittle, lamellar, like the alloys of bismuth and zinc, and no real utility in the arts.

Alloys of Bismuth and Nickel.—As with preceding combinations, we are not aware of any interesting application of the alloys of bismuth and nickel.

Alloys of Bismuth and Arsenic.—These alloys are more brittle and more fusible than bismuth. This metal, which is found in nature combined with arsenic, appears to have little affinity for it, when we make alloys. Nothing practical has been accomplished in the alloys of bismuth and arsenic. Arsenic is rapidly volatilized, and the very small proportion which is absorbed by bismuth is easily oxidized. Therefore the many difficulties attending the formation of the alloy, which in itself presents little interest, have prevented further examinations.

General Observations.—It will be seen from the preceding data, that the alloys of bismuth are not at the present time important in the arts, excepting the fusible alloys made of bismuth and certain white metals, such as tin, lead, etc. The alloys of bismuth with tin, the latter predominating, seem to be the most interesting. The great fusibility of the alloys of bismuth and lead will have the effect of popularizing these alloys, and also those with tin, as soon as bismuth can be obtained in abundance and at a less cost.

To sum up, the action of the bismuth in alloys is to increase their hardness, fusibility, and brittleness. But, although bismuth renders brittle the metals with which it combines, it does so to a considerably less degree than arsenic or antimony.—*Polytechnic Review.* W.

ABSTRACTS OF LECTURES ON MINING.—No. IX.

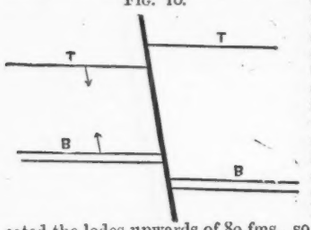
By Prof. W. W. Smyth, M.A., F.R.S., Royal School of Mines, London.

(From the London "Mining Journal.")

IN a district where you have the lode heaved by a large number of cross-courses, more or less parallel in direction, you may conclude that similar phenomena will attend each case, and so when you have once established the direction in which the heave occurs you may expect to find that repeated, and, indeed, it would be strange if this were not the case. In this manner you might establish a rule for that district and those particular circumstances, or you might, on the other hand, work out the relations of each case by the method of SCHMIDT, explained in the last lecture. We need only look at the tabulated statements by MR. HENWOOD to see that the relations of right hand and left hand, of smaller angle and greater angle, cannot be adhered to invariably, and that they are applicable only to a particular mine or particular district, where the circumstances are of a similar character. The miners sometimes complicate this matter unnecessarily, by refusing to see any law, or to recognize that one portion of the ground has slipped over the other, and that, as a general rule, the portion on the hanging side has slipped downwards. When the heave due to the cross-course is accompanied by a considerable lateral movement you may have the curious case of two lodes dipping in opposite directions heaved in the same direction by the cross-course. The evidence as to the occurrence of such lateral movements in the more or less horizontal striæ of the slickenslides is very satisfactory. It is sometimes regarded with great wonder that a small portion of a lode which has been dislocated by a cross vein should be found on the opposite wall of the latter, facing the main lode, although the broken part has been moved further down. In such cases we must remember

that the ground has frequently been opened several times in the same place, the evidence of which we have previously considered; and that it would seem that after the dislocation had occurred a subsequent re-opening gave rise to this portion, which appears to belong to the original lode. To illustrate the influence of dip on the direction of heaves, we may take the following case from the 250 fm. level of the Fowey Consols Mine, shown on plan in Fig. 10. The

FIG. 10.



two lodes, T and B, which dip in opposite directions, as shown by the arrows, are moved in opposite directions by the same dislocator, and this is entirely due to the difference in their dip, as may clearly be seen by working it out according to the method of SCHMIDT. And it will also be seen that in this instance a fixed rule as to turning to right hand or left hand would not hold good for both cases. One of the most interesting cases occurred in the Great Devon Consols Mine, where a large cross-course dislocated the lodes upwards of 80 fms., so much so that fresh shafts had to be sunk, and two portions worked quite separately.

We pass now from these lodes to a series of deposits of ore which put on in some districts many appearances of lodes, but which require to be treated in quite another category. We may meet at the surface of the ground an appearance like that of a lode, but yet we should not be justified in entering upon any extensive workings on the assumption of this—which is, in fact, an irregular repository—being propogated downwards, or horizontally, in the manner of a regular lode. These irregular repositories are what the French commonly call *amas*, and the Germans *Stöcke* (singular *Stock*). We may consistently divide these into four classes—1. Those which follow the plane of contact of two different rocks, perhaps for a considerable portion of that plane.—2. Those embedded in, or closely united with, igneous or non-stratified rocks.—3. Those associated with stratified rocks, or with rocks which are more or less metamorphic.—4. Those occurring in limestones. This is a division having more of a geognostic than of a geological character, for in the fourth class, for example, the characters we have to consider are common to the whole class of limestones, independent of their relative age. They are frequently noticeable at once as different from lodes in the materials they contain; from a want of regular arrangement in the minerals; for an absence of spaces lined with crystallized minerals, which are seldom found in this class of deposits, their general character being that they contain a large amount of material in a densely aggregated form, frequently crystalline, but usually consisting of very small crystals—*e. g.* the magnetite of Sweden. They are remarkably free from mixture with other minerals, except those actually embedded in them, as crystals of garnet.

Of irregular deposits at contact we have no remarkable examples in this country, but they may be seen in the continental deposits of iron ore, as in the Harz. Some of the lodes in those districts would appear to present much the same character, but may be distinguished usually by being carried out more regularly and to a greater distance. These occur at the junction of certain porphyries and of clay-slates: appearances of this kind have been also met with in the Harz, near Altenau and Clausthal, and again in the south-east part of Hungary. In this latter district a series of repositories extend over a district of from 30 to 40 miles, and may, I believe, be traced further on to the mountains of Servia; they occur where a series of secondary rocks are brought into contact with a great band of syenite, which courses through the country in a nearly north and south direction.

Among the irregular repositories in non-stratified rocks we have the *Stockwerke* of the Germans, a number of which occur in North Bohemia and Saxony. Some of these have been worked for tin from a very early period, never producing such great quantities of materials, however, as in our own tin mines. The usual feature is that in a granitic rock, flanked by gneiss or mica schist, a vast number of small veins occur, rendering it advisable to remove large quantities of the rock itself; in doing this it is exceedingly difficult, from the nature of the workings, the nature of the ground, and the oxidation of the rock, to work it with safety. It is said to derive its name from the fact that the workings are in successive levels or stocks. In other districts, gold, instead of tin, may be the mineral disseminated. In Cornwall near St. Austell, we have a great open working, which has been called a stock-work, but it is not really such, partly because the strings generally run pretty much in the same direction very much like little veins, and partly because the working of china-clay has led to it forming a great open work. There are one or two other kinds of repositories, of which I can give you nothing but very general statements as to their irregularity, such as the "tin floors" which occur in some parts of Cornwall, at no great distance from, or adjoining, the lodes. I must refer you to the earlier volumes of the "Transactions of the Royal Geological Society of Cornwall" for very full information about them; at present I do not know that there are any in work. In West Cornwall, in the neighborhood of St. Ives, are some irregular deposits, which have received from the miners the local name of "carbonas," and of which I may say no satisfactory explanation has yet been given. They are generally met with not far from the lodes, but pass off from the latter. the communication between them being, perhaps, only a small film of quartz. They pass off into a kind of pipe, which, generally speaking, has been filled with material, at first sight like coarse granite, but containing tin throughout. Generally there is a difference noticeable between this material and that of the lode, although there is a close analogy between them; schorl generally forms a prominent constituent of these carbonas. One of the most remarkable instances occurred at the East Wheal Lovell, where a succession of these irregular repositories, extending much in the direction of the lode, yielded a considerable quantity of ore. It should be observed that sometimes one of these carbonas lies entirely between two levels, being limited above and below. One of the most remarkable in Europe is the Monte Catini Mine, in Tuscany, between Florence and Leghorn, which resulted from the following down of a small tongue of copper ore seen at the surface, and which tongue opened out into a won erful mass belonging to this class of repositories. The ore is copper glance and bornite, exceedingly free from admixture, and although it is but a small mine, it has proved one of the richest in Europe. The adjoining rock is a variety of soft serpentine, termed by the Italians *gabbroroso*, in many parts exhibiting a brecciated character; it is so suffused with pyrites that in exposed parts, where there is not a strong current of air, the temperature is exceedingly high. This is the result, I believe, of the oxidation of the pyrites, and is one of the disadvantages connected with the mine.

We come next to the irregular deposits in stratified rocks, and may take, as an example, the great mine of Rammelsberg, in the Harz, as being the most ancient mine, which has worked continuously from before 1000 A. D., so it is said. The deposit was first met with in the side of a clayslate hill, and was found to enlarge downwards, and then to bifurcate. At its widest part it was 350 feet across, and extended about half a mile in length. The whole of the deposit is one dense mass of minerals, among which the most notable are different varieties of quartz and pyrites. No less than fifteen different metals have been met with, and a considerable number of them, from gold down to zinc and iron, have been more or less utilized. The great difficulty in these large workings is to support the walls, and in this case the working has been by the method of fire-setting. In this class also come the great deposits of iron pyrites in the south-west of Spain, at Huelon, near Seville, and in the adjoining part of Portugal, occurring in the midst of clayslate rocks. The district was worked long ago by the Romans for copper ores, which were found in irregular lenticular masses. The present working of pyrites are on so gigantic a scale that it has been found advisable to remove the top, and work the deposit as a large quarry. One of these is capable of supplying ore sufficient to load 400 to 500 ships in a year. The ore is shipped off to Liverpool and other parts for the manufacture of sulphuric acid, etc. The surface action has changed the pyrites from the surface down to a certain depth into the oxide of iron—in fact, into gossan.

The fourth and last class of these irregular repositories comprises those which occur in limestone; the circumstances of these are so varied that they demand a whole course of lectures to treat them fully. A deposit of lead ore of this kind in Flintshire—Fawnoz Mines—was first taken to be a regular east and west lode, and a series of shafts were sunk as usual, but the lode was not found. When the deposit was found again, lying between limestone and sandstone, it was taken for a bed, but in fact it was neither lode nor bed, it was really a series of irregular masses. These proved to be very rich, yielding massive pieces of pure galena and cerussite. Evidently the deposit had been introduced subsequently to the formation of both limestone and sandstone, inasmuch as it penetrated into and occupied the joints in each. The "flats" of the North of England District of Alston Moor belong also to this class, where from the sides of the lodes you have masses extending into the limestone wall; generally three of these have been observable and followed for a few feet, or for several yards, into the rock. As these have been in many cases very productive, a lode which flats off into the limestone is regarded as favorable. In Yorkshire what are called "flats" are somewhat similar, as in the district of Swaledale. The regular veins here running north and south have been extremely poor, although of large size, and containing much vein stuff; the men have driven out into the cross-cuts, and between the cross-cuts and the veins they have met with in these flats following joints in the limestone, and running nearly in the same direction as the veins. In some cases these flats found are of large size, and have evidently been washed out, or worn out by the action of water; when opened they are more or less filled up with matters fallen from the roof, etc., among which large masses of pure galena are very commonly found in enormous quantities. The "pipe veins" of Derbyshire are of an essentially similar character. Another series of this class of deposits which must be mentioned are the great deposits of hematite in the Whitehaven and Ulverstone Districts.

They, too, are great washed out portions of limestone. I can regard them as nothing more; they have much the appearance of lodes, but come to a sudden termination below, especially when they meet a bed of shale. From the nature of these deposits we may expect to find more or less impurity intermixed with the ore, but in some cases they are remarkably pure. As they are covered over with 20 or 40 feet thickness of boulder clay, which renders it a difficult matter to find any indications of them at the surface, it is found necessary to employ borers to go about testing the ground for them. The last series I may mention is that of deposits of iron ore—brown hematite—on the south border of the South Wales coal field, and notably also in the Forest of Dean. The deposits occur in irregular excavations, in rocks of dolomitic limestone, which are termed churns; the churns may sometimes contain sand or clay, sometimes brown iron ore. The average height of the churns is from 10 to 20 feet. Examples of this fourth class of irregular depositories are met with in Belgium, Westphalia, and the North of Spain, yielding ores of iron, zinc, and sometimes lead. BURAT, in his work, gives sections of some of them, and much information respecting them may be found in the "Transactions of the Geological Society of Germany." They are exceedingly interesting, as defying all attempts to reduce them to anything like rule.

STEAM STREET CAR ENGINES.—The Philadelphia *North American* says that the running of dummy engines on Market Street, in that city, though necessitated by the heat that interfered with horse-power, and necessity of accommodating visitors to the Exhibition, has been so greatly approved by passengers, and has been so completely free from any of the evils apprehended, that there is some reason for believing the motor introduced compulsorily will be retained from choice and altered and amended until it is perfect. The Reading Railroad Company have followed the example by the inauguration of a steam line from Front and Willow Streets to the Centennial grounds.

STATE AID IN ENGLAND TO SCIENTIFIC RESEARCH.—A correspondence has been published showing that on the 29th April the Duke of Richmond and Gordon wrote to Dr. HOOKER, the president of the Royal Society as follows:—"As you are aware a sum of £1,000 is voted annually by Parliament 'to enable the Royal Society to defray the expenses of scientific investigations considered by a committee of the society to be worthy of such aid.' This committee, called the Government Grant Committee, consists of the President and Council of the Royal Society, and twenty-one other gentlemen of scientific eminence, not members of the Council; and the grant is expended in aiding investigators to provide themselves with apparatus and assistants, but never in personal payments to the investigators themselves. It is proposed that this action of the State should be extended, and that further aid should be given to research by according permission to the Government Grant Committee to recommend in certain cases the payment of personal allowances to gentlemen during the time they are engaged in their investigations; that a sum of £5,000, including the above-mentioned £1,000, should be taken annually; that the Royal Society should be invited to aid Her Majesty's Government with their advice and assistance in its appropriation and expenditure, and as to the sums to be granted in each case, reporting annually to the Lords of the Committee of Council on Education on the progress made, and the desirability or non-desirability of renewing the grant; and that this experiment should be tried for five years. The administration and expenditure of the grant, and accountability for it, should, we consider, be vested in the Science and Art Department of the Committee of Council on Education, by which the vote will be taken; and all instruments purchased for investigations should be left in its charge when no longer required." The President and Council of the Royal Society concurred in the proposal, the grant of £1,000 remaining exactly as at present, and a sum of £4,000 being taken on the conditions expressed in the duke's letter.

WENGLER AND LOWE'S APPARATUS FOR CLASSIFYING LOW GRADE ORES, AND THE GERMAN SYSTEM OF CONCENTRATION.

WITHIN the limits of this article it would be impossible to enter into a detailed description of the magnificent dressing floors recently erected at Clausthal, at a cost of over a million thalers, or to enter into a minute description of the less extensive, but more complicated, system of Freiberg, both of which lie more in the domain of a book, which should soon make its appearance as an addition to mining literature. The present article will mainly bear upon the recent introduction of classification, the great essential preliminary to final concentration, and a few remarks upon the Freiberg system, where the classifying system is in use.

The question, "How to treat low grade ores successfully" has only been partially answered in this country, and as means have long been needed to treat such ores legitimately and economically, we naturally turn toward Europe, the mother of mining, for some tangible evidence or means for basing a system which will meet with sufficient encouragement to give it strength to answer the above question. To dress ores successfully is as important and as difficult as to smelt them successfully, requiring the ingenuity of a skillful mechanic, and the brain of a mathematician, for the laws of hydraulics and the specific properties of bodies play the great rôles in the treatment of ores.

A knowledge of the laws of moving bodies of different gravities in quiet water, and in ascending and descending currents of water, is the foundation of a successful treatment. We have the means of basing such a system by studying thoroughly the classifying system now so popular in many of the great mining districts of Europe.

Classification is an old term, but in a practical sense it is new in mining vernacular. It is the method of classifying ores, no matter how simple or complicated they may be, into different corn sizes, from one to a hundred, if it is desired, by a system of vessels arranged in a mathematical series, according to their capacities, in conjunction with a series of columns of water of varying supply, with the same hydraulic head, but greater from the head on the apparatus reacting up and against the descending columns in the vessels containing the stamped material, thereby classifying such stamped material into different corn sizes or grains, and completely freeing them from their slimes by virtue of their superior resistance to the upward reacting currents.

Above is a drawing with sections and description, with results of the classification, designed by ROBERT MORITZ WENGLER, Director General of the famous Himmelfahrt Fund Mine at Freiberg, and recently patented in this country jointly with FRANCIS A. LOWE, of Washington, D. C. Fig. 1 is a plan; Fig. 2, an elevation; Fig. 3, a longitudinal vertical central section; Fig. 4, a transverse vertical section through A B; Fig. 5, a like section through C D.

The classification consists of five reversed pyramidal-shaped vessels, increasing in size, which vessels, when full, are in communication with each other; they are shown in the drawing from I to V. From the bottom of each vessel there extends a tube, as shown at *a*, *b*, *c*, *d* and *e*, and each tube is connected with a tubular foot piece, as shown at *f*, *g*, *h*, *i*, and *k*. From a trough G, situated some distance above the apparatus, a series of five tubes *l*, *m*, *n*, *o*, and *p*, extend down and connect each with one of the foot pieces. The trough G, serves as a clear water conduit to supply water to the tubes *f*, *g*, *h* *i*, and *k*. Attached to each of the tubes last mentioned are small sluices or gates, *q* and *r*, intermediate between which is the lower end *a*, *b*, *c*, *d*, or *e*, of the vessel which opens into the tube. The sluices serve to regulate the influx of water, and the efflux of the corn or kernels of ore.

Fig. 2.

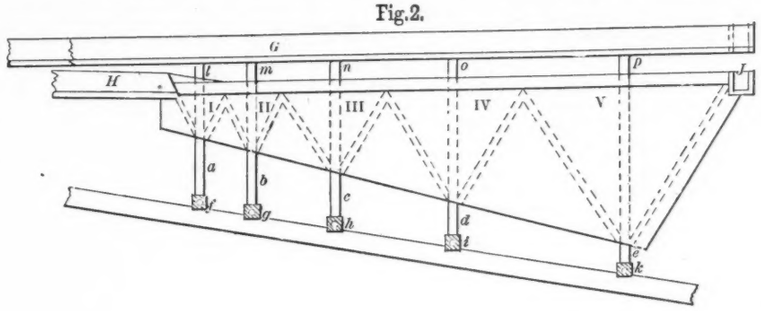


Fig. 1.

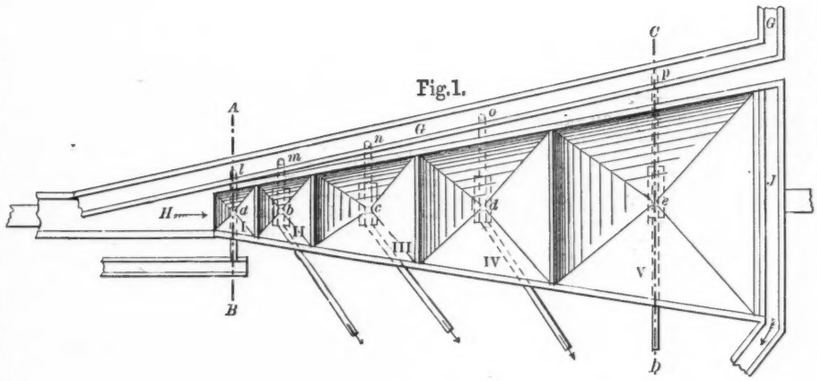


Fig. 3.

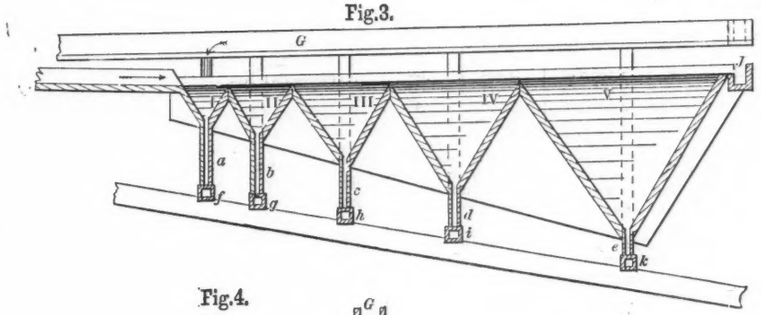


Fig. 4.

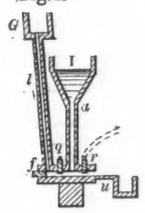
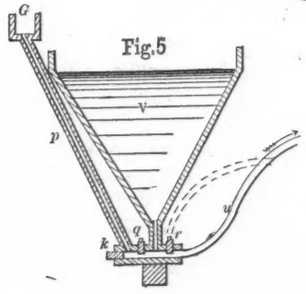


Fig. 5



The water in the trough G, is, as before stated above the level of that in the main portion of the apparatus, and it therefore has a more powerful head; consequently, if the sluices be so adjusted that the efflux opening at (*r*) be smaller than the influx opening at (*q*) then a part of the pure water which would otherwise flow out at (*r*) will reach up and against the downward current on, for instance, the tube (*a*). It will therefore be seen that it is possible for such kernels or grains, only, whose weight is greater than the resistance of the upward reacting stream, to flow out at (*r*), the other and finer ore, together with the slime flowing over into section II., where the same operation is repeated, only on a finer scale, and so on to the last section or vessel which receives all the slimes and the ore of ultimate fineness. Here the operation is again gone through with, and, by a simple adjustment of the sluices of this last section, all the slime is made to pass over into the trough, J, mechanically mixed, with a loss of about 4 per cent. ore, which loss is subsequently treated and concentrated in their systematic manner.

The separation of the different corn or grains can be accurately regulated, inasmuch as the slightest movement of the sluices has a remarkable influence upon the classification, and according as the reacting stream is stronger or weaker, the corn classified thereby from the mass of stamped ore, will be correspondingly coarser or finer.

The graded or classified corn, as it passes out of the tubes (*a*), is carried by a simple arrangement of waterways to its proper place of concentration, which will be treated in the few remarks on the Freiberg system.

As a short recapitulation of the results obtained at Freiberg, the following are given. The classificator passes, per hour, 64,800 liters of stamped material mixed with water, and containing from 2,300 to 2,500 lb. of ore and slime. A liter is a little over an English quart, or, in round numbers, it passes 16,200 gallons per hour.

The following table gives the working capacity of each section per minute, hour, and day:

Sections	Liters per minute.	Weight in kilograms of classified ore per minute.	Liters per hour.	Weight in kilograms of classified ore per hour.	Liters per day.	Weight in kilograms of classified ore per day.	Remarks.
I.	76·5	4·9	4,390	294	110,160	7,056	Diameter of corn ½ mm.
II.	72·	3·1	4,320	186	103,680	4,564	1 mm.
III.	65·2	2·1	3,912	126	93,688	3,024	and
IV.	45·	1·55	2,700	93	64,800	2,232	under ½
V.	39·3	1·35	2,358	81	55·592	1,944	mm.
Totals.	29·8	13·00	880	780	427,920	18,820	

Total parsed per day, 1,555,200 liters, of which 427,920 liters pass through the tubes (*u*) from the classificator, leaving 1,127,280 liters of "Trübe" containing about 4 per cent. of the stamped ore, which passes over the apparatus into the trough J, and which carries it to an ordinary "Spitz-lutten" apparatus of two sections. Of the 427,900 liters passed through the classificator, they contain 18,820 kilograms of classified and slime-freed ore, or 41,404 lb., or nearly 20 tons, from a battery of 24 stamps. The economy and simplicity of

this system have awakened the greatest interest at the Himmelfahrt Fund Mine, and those who are familiar with the complicated character of the Freiberg ores are also aware of the extreme difficulty they had met with, heretofore, in dressing the same, especially the ore of the kiesblendigen lead and heavy-spar formations, consisting of quartz, gneiss, clay, heavy calc-braun-fluor-spar, and carbonate of iron, galena, zinc-blende, copper, and arsenical pyrites, besides traces of native silver, glaserz, ruby silver, melanglanz, and lugenglanz.

The extreme tediousness of the old method of transporting the stamped ore from the "Mehlfuhrung" or reservoirs near the stamps to the shaking tables, and the unsatisfactory results attained for the want of a system of slime-freeing gradation, led the Director, Mr. WENGLER, to design the apparatus as represented in the drawing, through which they were enabled to arrive at an excellent degree of classification, or, in other words, the stamped ore from the batteries, after passing through the different sections of the classificator, passed on to the jiggers and shaking tables as pure as sand, completely freed from all their slimes, which, in the old method, were a source of great trouble, as the arrangements they had for eliminating the slimes were very imperfect.

Another great advantage which was expected, and which will be readily seen should occur, was that the grains of galena, iron and arsenical pyrites concentrated upon the jiggers and shaking table, were of the same size and weight (the all-important condition for successful treatment), due, as will be seen, to the superior resistance of the upward reacting currents; whereas by the old methods the concentrations were not homogeneous, necessitating the additional work of separating the finer corn from the coarser, and the re-stamping of the latter before sending it to the smelting works. The introduction of the system was also the means of decreasing the number of men employed from nine to five, whose immediate duties are to look after and feed the twenty-four stamps with ore, and the concentration of the same and slimes upon sixteen shaking tables and a system of jiggers. From the old wheel-barrow system of transportation and treatment, a superb system, brought down to a mechanical nicety, has been developed.

TO BE CONTINUED.

TABLE OF PRODUCTION, EXPORTS, STOCK, WELLS AND SALES, OF CRUDE PETROLEUM FROM AUG. 28, 1859, TO AUG. 1, 1876.

Years.	Production. Bbls.	Exports. Crude, Refined, and Residuum. Galls.		Average Price on the Creek, per bbl.	Stock in Producing Region on the 1st day of the year.	Produc'ng Wells 1st day of the year.	Drilling Wells 1st day of the yea r
1859	2,000	.....		$20 00			
1860	500,000	.....		9 60			
1861	2,113,609	1,500,000	From Titusville Herald.	0 30			
1862	3,056,690	10,887,801		1 15			
1863	2,611,309	28,250,721		3 25			
1864	2,116,109	31,872,724		7 62			
1865	2,497,700	29,805,523		6 18			
1866	3,597,700	67,440,451		3 78			
1867	3,347,300	67,052,029		2 54	‡289 100	1,020	232
1868	3,646,117	99,281,750		3 95	559,100	1,246	182
1869	4,215,000	102,748,604		5 48	264 805	1,325	378
1870	5,260,745	141,208,155	Prod. N.Y. St'g Ass.	3 74	340,154	1,800	364
1871	5,205,341	156,514.735		4 50	537.751	2,897	140
1872	5,939,003	150,162,419		3 84	532,971	3,892	368
1873	9,890,964	237,481,633		1 84	1,183,728	4,485	361
1874	10,950,730	233,143,151		1 29	1,948,919	3,311	37
1875	8,787,506	232,411.817	Ltd.	1 48	4,104,703	3,230	40
*1876	5,023,351	128,126,217†		2 15	3,326,726	3,314	142

Total, 78,761,174 barrels crude petroleum produced in Pennsylvania oil fields, from August, 1859, to August, 1876. The exports, as near as we can ascertain from the reports we have been able to consult, from A. D. 1861, to August, A. D. 1876, amount to 1,717,877,730 gallons crude, refined, naphtha, and residuum.—*Stowell's Petroleum Reporter.*

* First seven months of 1876. † To July 29, 1876. ‡ First iron tanks built.

COMPARATIVE SYNOPSIS OF PETROLEUM REPORTS FOR JUNE AND JULY.

	JUNE, 30 Days.	JULY, 31 Days.	
Stock on hand at the wells, bbls	174,934	162,243	Dec. 12,691
Production for the month	723,600	763,623	Incr. 40,023
Daily production	24,120	24,633	" 513
Producing wells	4,527	4,774	" 247
Drilling wells	340	353	" 13
Stock in iron tanks and pipe lines	3,494,829	3,052,094	Dec. 442,735
Stock held by refiners	121,879	112,389	" 9,490
Total stock	3,791,642	3,326,726	" 464,916
Total shipments	921,862	1,228,539	Incr. 306,677

Price at Titusville and Oil City, $2.26@$2.60.—*Stowell's Petroleum Reporter.*

THE MECHANICAL EFFECT OF "BLOWN-OUT SHOTS" ON VENTILATION.

By Messrs. Hall (H. M. Inspector) and Clark.

AN opinion is frequently expressed in Lancashire and elsewhere that in blasting coal with gunpowder in a mine fairly clear of fire-damp, an explosion may result from the exhaustive action of the blast itself. It is held that a shot fired under certain conditions will relieve the atmospheric pressure on the face of the coal to such an extent that fire-damp will be instantly given off in considerable quantity, and that in very fiery seams the danger from this source is imminent. The circumstances under which this is stated to be most liable to arise are these—When in driving a narrow winning or heading, and having advanced some distance beyond the innermost holing or cut through, a charge of gunpowder is so improperly planted or insufficiently stemmed as to cause it to blow out, and spend its energy on the ventilation passing along the heading instead of doing its legitimate work of blowing the coal. Such an occurrence is locally termed a blown-out shot. It must not be confounded with that with which all miners are familiar, called in Northumberland a "standing bobby." In this latter case the powder expends itself by ripping the coal, and escapes, as it were, by distribution, without affecting the ventilation, and generally leaving the stemming in the drill-hole.

A blown-out shot would appear to attain its maximum force when it occurs in very strong coal, where a heavy charge is necessary, and the stemming has been fairly well done, so that it withstands for an instant until the exploding powder, rapidly gaining accumulated power through the heat of its own combustion, forces itself out, driving the stemming as from a cannon. We, perhaps, hear more about these shots in Lancashire than in other districts on account of the coal being so very strong, and the unfortunate practice of shooting partially fast—that is, without nicking or side cutting—entailing heavy charges, amounting in many instances to 2½ lb. of gunpowder, or even more. Indeed, locally this subject has assumed very great importance, many mining men of considerable experience having given it as their opinion that some of the recent disastrous explosions have been due to this cause alone. Notably, an explosion at the Wynnstay Colliery of the New British Iron Company, near Ruabon, on April 24, 1873, in which seven persons lost their lives. The position of the shot holes was shown by the aid of a plan of the workings, and the evidence taken at the inquest was referred to, in the course of which Mr. THOMAS BELL (H. M. Inspector) said—"One of two things must have occurred; either the first shot liberated gas, which was fired by the second, or one of the shots having blown out would cause a partial vacuum in the place, which would be immediately filled with gas from the cavities in the coal, and would at once become mixed with sufficient atmospheric air to make it explosive, and this might be ignited by burning embers left by the shot." The jury said—"That from the evidence before them the accident occurred from an explosion of powder arising from the drill-holes not being sufficiently bored, and the stemming being improperly secured."

The writers do not think it desirable that they should express any opinion on this particular case. It is mentioned rather to show to the Institute the very serious results that have been, and which continue to be, attributed to this cause, and it is hardly necessary to point out how highly important it is that the subject should be thoroughly investigated, with a view to proper precautions being taken if they prove to be needed. This subject has special interest at the present time, because there is a tendency to impute to blasting in mines results and dangers which it is questionable whether this operation when fairly carried out does really entail. It was with the object of gaining some reliable information as to the actual effect of blown-out shots, which are no doubt the worst aspect of blasting, that the experiments, the details of which we propose to lay before you, were undertaken, and with the hope that this beginning might lead to discussion and a thorough investigation. If it is true that people are maimed and burned by blasting at distances varying from 10 to 180 yards, when there is no fire-damp present to cause such destruction, then it is quite clear that this results, either from the simple force and flame of the shot on account of the weight of the charge; or, from this force and flame assisted by the rapid combustion of coal dust as it travels on its course; or, from the force and flame assisted by an instantaneous emission of gas, in consequence of a partial vacuum being formed by the rushing blast.

With a view to testing the first of these assumptions—that the havoc is caused by the unassisted gunpowder contained in the charge—varying charges were fired from a strong iron tube, 2 ft. long and 2½ in. diameter, at the face of a slant or adit which had been driven down from the surface and arched with brickwork a distance of 45 yards, its sectional area was 30 ft. which would fairly represent a winning or heading. The stemming was done with small debris, and the mouth of the cannon directed so that the discharge might pass freely up the slant. Gauze sheets of thin and easily inflammable material were suspended at intervals of 15 ft., by means of cross-pieces of timber reaching from about two-thirds the height of the arching nearly down to the thill, and in each cross-piece small holes (1 in. diameter and 2 in. deep) were drilled so as to face the blast, and these were filled with fine gunpowder.

EXPERIMENT No. 1.—Fired 1½ lb. powder; Canvas and cross-piece at 15 ft. knocked down, but no appearance of flame having reached this distance.

EXPERIMENT No. 2.—Fired 2 lb. powder; Canvas and cross-piece at 15 ft. knocked down, but no appearance of flame having passed.

EXPERIMENT No. 3.—Fired 2½ lb. powder; Canvas and cross-piece knocked down at 15 and 30 ft. but no appearance of flame.

EXPERIMENT No. 4.—Fired 2 lb. powder; Canvas and powder burnt at 15 ft.

EXPERIMENT No. 5.—Fired 2½ lb. powder; Canvas and cross-piece knocked down at 15 and 30 ft., but no appearance of flame.

These experiments were continued, but in no case was either canvas or the powder burnt beyond 5 yards from the point where the shots were fired. The tube was afterwards stemmed very tight so as to cause the explosion to burst it, but the flame traveled no further in this case. The blast at the mouth of the slant (45 yards) was certainly perceptible, but comparatively unimportant.

To test the second assumption—that the force and flame are assisted by the rapid combustion of coal dust as it travels on its course—a similar tube was used, the stemming in this case being small coal; gauze sheets and gunpowder were fixed, as before, at intervals of 15 ft. in the slant; the thill for 8 or 9 yards from the face was thinly covered with coal dust obtained from the screens.

EXPERIMENT No. 1.—Fired 1½ lb. powder; canvas and powder at 15 and 30 ft. burnt; at 45 ft. not burnt; blast at mouth of slant very strong.

EXPERIMENT No. 2.—Fired 2 lb. powder; canvas and powder at 15, 30, and 45 ft. burnt; at 60 ft. not burnt; blast very strong, knocking down the three nearest cross-pieces.

EXPERIMENT No. 3.—Fired 2½ lbs. powder; canvas and powder at 15, 30, 45, and 60 ft. all burnt; blast at the mouth of the slant, a distance of 45 yards, very fierce, lifting and driving a metal pipe, weighing nearly ¼ cwt., 15 yards, and moving a coal tub on the pit heap, 75 yards distant.

EXPERIMENT No. 4.—Coal dust having been scattered on deals the whole length of the slant (the hill being very wet), fired 2½ lbs. of powder; in this case flame issued strongly at the mouth of the slant, having traveled 45 yards. The blast was very fierce, and would certainly have proved fatal to any one struck by it in its course. It was noticeable in these experiments that not only the flame was largely increased, but the blast was also proportionately greater. And bearing in mind that the floor of the slant was very wet, the roof dripping, and the temperature low (50°), we may fairly assume that in dry mines, at a high temperature, and where the roads are always thickly covered with fine dust, that this dust will play a considerable part in extending and adding to the destruction of an explosion.

To pass now to the first part of the third assumption—on any partial vacuum being formed in a colliery working there is an instantaneous emission of fire-damp. It is, of course, well known that any relief of atmospheric pressure causes fire-damp to be given off more freely; but since natural variations of this description are gradual, and occur within narrow limits, it is usually quite practicable to deal with them without much difficulty. But the assumed condition is much more serious than this, and, at any rate, may be supposed to amount to a relief of one-half the natural pressure, or 7 or 8 lbs. per square inch, and this occurring in an instant. For the purpose of testing the result of such a sudden and unusual occurrence in a mine a wrought-iron pipe, 4 in.

diameter and 4 ft. long, was procured, and fitted with a piston and a vacuum gauge. This instrument, when tried experimentally, registered a vacuum of 13 lb. It was then taken underground, and a hole having been drilled 18 in. deep into the coal on the side of a level in the Bastian seam (360 yards deep), was inserted and wedged as air-tight as possible with wooden wedges. On the piston being drawn once rapidly back the gauge registered 2½ lb. for an instant, but the issuing fire-damp seemed immediately to fill the tube, and quickly balanced the outside pressure. Then forcing the piston forward fire-damp was driven in large quantities through the coal in various places at some distance from the point where the pipe was fixed, and on being lighted had the appearance which they illustrated. The gauge was now taken off, and the fire-damp allowed to escape through the aperture; the issuing gas was in this case sufficient to feed a flame 3 ft. long. The pipe was next inserted in the face of a heading in the Wigan Nine feet, one of the most fiery seams known (190 yards deep); on the piston being drawn back fire-damp followed instantly, no vacuum being shown. On account of the dangerous character of the seam we did not attempt to burn the gas on making the return stroke, but there was evidently a large quantity forced through the coal, as in the last experiment. The next trial was in the Pemberton Four feet (240 yards deep), a seam considered to make very little gas, but the result was the same, large quantities being driven out, and it was then lighted.

Although the superficial area of coal exhausted in these experiments was very small, amounting only to a few inches, the quantity of fire damp given off was very remarkable; great care was taken to burn it, yet in one instance a rather serious quantity collected about the roof. The writers have not as yet succeeded in proving an affirmative as regards the second part of the third assumption—that a partial vacuum is formed by the rushing blast from a blown-out shot. The following experiments with this object have been carried out:—A boiler was procured 24 ft. long and 6 ft. diameter, and having closed all the openings with the exception of one end, a vacuum gauge was attached, and charges of powder varying from ½ to 1 lb. fired from a tube fixed at the closed end, and so directed that the blast might pass freely towards the open end. A number of shots were fired, but in no case did the gauge register any vacuum. A small mercurial gauge was also fitted on, but this was put out of order by the vibration. Having failed with the boiler, the down-cast pit, in connection with the slant, was next closely covered with deals and sand, and 2½ lb. of powder fired, but the gauge still refused to show any relief of pressure. It was noticeable in this last experiment that through the ventilation being entirely cut off, the effect of the shot was very slight as compared with similar charges fired when the air was passing freely. We hope at some future time to carry these experiments further, and record the result, as it seems quite impossible that there should not be a considerable relief of pressure, may be only for an instant, but still appreciable, because the expanding gases from the powder come in contact with the air passing as ventilation after having attained considerable velocity, and must necessarily reverse its direction, and meantime these gases are cooling down, and their pressure rapidly diminishing.

In conclusion, the writers feel confidence in submitting, as the result of their observations and experiments—

1.—That flame from a blown-out shot, unassisted by gas or coal dust, does not travel further than 5 or, at the utmost, 10 yards, entailing little or no danger.

2.—If coal dust be present even in a comparatively damp mine, this flame may travel 50 yards; that in a dry mine of a high temperature this distance would be greatly exceeded; and since miners, as a rule, consider themselves safe at from 15 to 20 yards from the point where the powder is being used, a blown-out shot, under these circumstances, is a source of great danger.

3.—That the violence of the blast from either gunpowder or fire-damp is much increased when coal dust is present.

4.—That on any partial vacuum being formed in an underground coal working, fire-damp will instantly issue in dangerous quantity; and there are fair grounds for assuming that a shot blowing out in the face of a narrow heading, and setting coal dust on fire in its course, would by its exhaustive action produce such a vacuum, and might cause a serious explosion in a mine practically clear of gas.

5.—Although no experiments have been made directly to test the result of coal dust set on fire in air heavily loaded with fire damp, there is every likelihood that such an occurrence would be attended with grave consequences.

6.—That it is desirable that any system of blasting coal which entails heavy charges of gunpowder and an unusual liability to shots blowing out, such as blasting without side cutting, or nicking or using improper material for stemming, should be discontinued.

7.—A large body of flame, such as results from a very heavy charge or from a blown out shot, is required to ignite coal dust; that in blasting with charges not exceeding 12 ozs., accompanied by the proper preparation of holing and side-cutting, there is little liability of this taking place. As these experiments progressed the important part which coal dust seemed to play was forced upon the writers' attention.

We find some interesting remarks as to the amount of work stored up in coal in a paper forming part of the Philosophical Transactions of the Royal Society, published in November, 1875, contributed by Capt. NOBLE and Mr. F. A. ABEL, entitled "Fired Gunpowder." They state—"It is interesting to compare the above work of gunpowder with the total theoretic work of 1 gramme of coal, which is about 3,400,000 gramme units. The work stored up in 1 gramme of coal is, therefore, more than ten times as great as that stored up in 1 gramme of powder (332,128 gramme meters). The powder, it is true, contains all the oxygen necessary for its own combustion, while the coal draws nearly 3 grammes of oxygen from the air. Even allowing, however, for this, there is a considerable inferiority in the work done by gunpowder, which is, doubtless, in part due to the fact that the coal finds its oxygen already in the form of gas, while a considerable amount of work is expended by the gunpowder in placing its oxygen in a similar condition. In an economic point of view, also, the oxygen stored up in the gunpowder is of no importance, as that consumed by coal costs nothing, while the oxygen in the powder is in a most expensive form. The fact is, perhaps, worth noting as demonstrating the impracticability of making economic engines deriving their motive power from the force of gunpowder." Now, it would appear to follow from these remarks that if coal could be consumed with a rapidity at all approaching that of gunpowder, then it would partake somewhat of the nature of an explosive. Perhaps the fact that it has to obtain its oxygen from the surrounding air is in the way of its attaining anything like instantaneous combustion, but we must bear in mind that, when finely disseminated in air of a high temperature, it is certainly in a condition most favorable to rapid combustion.

MINING NOTES FROM CALIFORNIA, COLORADO, CONNECTICUT, AND NEVADA.

CALIFORNIA.—*The Rising Sun Gold Mine.*—This mine is located about one mile from Colfax, and is undoubtedly the best paying quartz mine in Placer County. The eighteenth dividend will be declared during the present month. The mill connected with this mine is complete in every particular. It contains three fine engines, which are used for the hoisting works, pumping, for the stamps, and for other machinery in use in the mill. Forty-five men are employed by the company; two shifts of men are worked in the mine, but the mill is run only in the day time. The shaft is down now 640 feet, and the quality of rock taken out is equal to the best yet taken out of it, and the indications are that the value of the rock in the ledge is increasing rather than decreasing; and from the prospecting which has already been done, it is believed that the ledge is very extensive and will last a great many years.—*Dutch Flat Forum*, August 17th.

The Vulcan Coal Company's Mines, which are situated in the Santa Cruz Mountains, two and a half miles from Corralitos, has, it is stated, two distinct veins of coal, one of which is nine feet in thickness and the other five. The quality of the coal, it is claimed, is very well fitted for any of the purposes to which the coast coals have been applied. The new machinery of the mine will soon be in position, when the company hope to be able to supply all demands for their product.

COLORADO.—*The Stevens Silver Mine* in Clear Creek County, Colorado, is situated 12,500 feet above the level of the sea, on McClennan Mountain. A very curious fact has been discovered during the operations in this mine. After a depth or distance of ninety feet from the surface, the crevice matter in which the silver is found, is frozen solid. Summer and Winter have no visible effect to change its temperature, nor is there ever any perceptible thaw. Pick and drill fail to work the frozen mass, and the only way the workmen proceed is to kindle a large fire at night against the matter, and in the morning to pick at the disintegrated ore. After this curious fashion the mine has been profitably conducted for two years. From ninety feet, where the cold was struck, the tunnel has proceeded inward, now nearly 200 feet, and the cold is in no way diminished as yet. Other mines in the neighborhood show the same singular condition, and in all of them the depth under ground is such that the frost cannot possibly have penetrated there. The conclusion reached is that it is a relic of the glacial era. Whatever its origin, it is certainly a singular and interesting fact, and the method of mining, although profitable, is as simple and primitive as could well be devised.—*American Journal of Science and Arts.*

CONNECTICUT.—*Feldspar Discovery.*—There has just been discovered on the slope of West Mountain, near Ridgefield, Conn., a mine of feldspar. The yield is reported to be by far the best of its kind yet discovered in this country, being of pure crystal, white and free from flint and earthy matter. This discovery is a valuable one, as heretofore almost all the feldspar used in this country has been imported.

NEVADA.—*The Virginia City Coal Company*, whose mine is in El Dorado Cañon, a few miles south-west of Dayton Nevada, have just made a curious discovery in their main shaft. After passing through two veins of coal (lignite) about 15 feet in thickness, and 200 or 300 of sandstone and other sedimentary rocks, they have now reached what seems to be the bed of a lake. The whole bottom of the shaft is in a mixture of sand and gravel. The pebbles are worn as smooth as glass. As there is a good deal of gold in the surface gravel over the coal mine, it is not unlikely that there may be gold in the gravel now struck. The company intend continuing their shaft, and will now prospect for gold as well as coal. The lake appears to be roofed in with two thick veins of coal and some 800 feet of sandstone.

The Proceeds of the Comstock Mines for the quarter ending July 31st, as they appear on the Assessor's books of Storey County, Nevada, are given by the Gold Hill *News* as follows:

MINE.	Tons extracted.	Average value per ton.	Gross Yield.	Total Cost.	Amount deducted by law.	Net yield or value upon which taxes are levied.	Total amount of tax.
Belcher.	40,620	$21	$887,010 00	$818,712 27	80 per cent.	$177,402 60	$4,346 35
Crown Point	22,582	15	344,082 00	448,021 55	" " "	68,816 57	1,686 00
Chollar-Potosi	4,704	20	94,289 00	169,694 60	" " "	19,838 00	387 23
California	29,120	155	4,519,690 40	783,688 94	.....	3,736,001 46	72,852 03
Con. Virginia	36,093	109	3,963,280 79	1,406,080 67	.....	2,557,200 18	49,865 40
Imperial Con	506	62	31,782 00	6,837 75	.....	24,944 25	611 13
Imperial by C. C.Stevenson.	998	14	13,970 00	19,361 85	80 per cent.	2,794 00	68 45
Justice	1,306	31	40,656 15	24,454 56	60 per cent.	16,262 46	398 43
Ophir	18,250	36	669,241 09	438,018 00	" " "	267,696 44	6,220 08
Overman	1,478	30	44,775 45	44,775 45	" " "	17,910 18	438 80
Totals	155,657	.....	.....	.....	.....	$6,888,885 54	$135,873 90

During the same period 5,219 tons of tailings were worked from the above mines, which gave a product of about $52,000, equal to an average of nearly $10 per ton. The cost of the reduction of this amount is about $39,278, equal to a fraction over $7 per ton.

We observe a number of errors in this statement, and having no reliable data from which to trace them, are compelled to publish them as above.

Fire Clay Discovery.—A valuable bed of fire clay has just been struck in El Dorado Cañon, Lyon County, Nevada.

NOTES.

THE WEBB LEAD MINES, located in the southwestern part of Missouri, reported a yield of 65,000 lb. of mineral and 138 tons of zinc blende, for the week ending the 12th inst.

EXTRACTION OF GALLIUM FROM ITS ORES.—To get this mineral, says M. DE BOISBAUDRAN, you must take the advice given in the cookery book, about catching your hare. To extract a few centigrammes of gallium you must first get matter that contains any of it, and that is the difficulty. To go exploring, at least 25 kilogrammes of ore are indispensable, for one wants at least 500 kilogrammes of rich ore, so-called, for 10 centigrammes of gallium. M. DE BOISBAUDRAN divides the ores he treats into four groups: A, rich ores; B, poor ores; C, very poor ores; E, ores containing no gallium.

ROMAN EXHIBITION OF ASBESTOS.—An interesting exhibition has just been organized at the Simonetti Palace, on the Corso in Rome, of a fire-resisting silicate of magnesia. This display of asbestos is in all the stages through which it passes, from the time it is taken out of the earth until it appears as a manufactured article. The ancients had a means of weaving it, and with it made napkins for meals, wicks for lamps, and winding-sheets for the dead for purposes of cremation, so that the ashes of the deceased could be collected unmixed with those of the wood which had formed the funeral pyre. The process of working this textile has been re-discovered by the MARQUIS DE BATHERA, as well as the means of making with it incombustible paper and cardboard at a low price.

TRADES UNIONISM.—A novel case has arisen in Canada, under the laws regulating Trade Unions. A stone-cutter in Montreal, who did not belong to the Stone Cutters' Union, accepted work from a firm employing Union hands, but at less rates than the Union enacted. The Trade Unionists then, by threatening a strike, compelled his discharge. The stone-cutter has sued the Trade Union, which is a regularly incorporated body, for actual and prospective losses caused by its action, and has laid his damages at $1 000. He has engaged eminent counsel, and expects to pursue the suit vigorously. The Canadian law is very stringent on the subject of strikes, and it gives an aggrieved party the right to proceed both civilly, as is here indicated, for damages, and criminally by charging a conspiracy to injure him.

STATISTICS OF COAL PRODUCTION.

This is the only Report published that gives full and accurate returns of the production of our Anthracite mines.

Comparative Statement for the week ending Aug. 19.

Tons of 2,240 lb.	1876.		1875.	
	Week.	Year.*	Week.	Year.*
Wyoming Region.				
D. and H. Canal Co	24,800	1,097,034	59,431	2,023,473
D. L. and W. RR. Co.	35,677	876,555	58,963	1,982,081
Penn. Coal Co	11,655	572,437	30,984	832,896
L. V. RR. Co	26,223	571,157	21,888	570, 83
P. and N. Y. RR. Co	1,485	16,162	1,724	71,174
C. RR. of N. J	34,207	715,157	50,475	625,019
Penn. Canal	14 357	225,785	15,509	113,100
	160,404	4,074,287	238,974	6,224,682
Lehigh Region.				
L. V. RR. Co	36,156	1,484,439	84,015	735,396
C. RR. of N. J	29,766	733,805	24,688	237,973
D. H. and W. B. RR.	—	26,332	1,952	47,479
	65,922	2,244,576	110,655	1,020,848
Schuylkill Region.				
P. and R. R. RR. Co	85 232	2,476,340	162 817	2,050,980
Shamokin & Lykens Val.	14,684	487,091	29,852	765,944
	99,916	2,963,433	192,669	2,816,924
Sullivan Region.				
Sul. and Erie RR. Co	148	26,953	—	5,557
Total	326,390	9,309,249	542,298	10,068,011
Increase	—	—	—	—
Decrease	215,908	758,762	—	—

* Year beginning January 1st.

The above table does not include the amount of coal consumed and sold at the mines, which is about seven per cent. of the whole production.

Perth Amboy business:

	Tons.
Received for the week	15,198
Shipped for the week	21,278
On hand Aug. 19	64,845

Freights to Boston, 90c.; Hartford, 90c.; New Haven, 60c.; New York, 35c.

The decrease of shipments of Cumberland Coal over the Cumberland Branch. and Cumberland and Piedmont Railroads amounts to 352,624 tons, as compared with the corresponding period in 1875.

Belvidere Delaware RR. report.

	Week.	Year 1876.	Year 1875.
Receipts of coal at Coal Port (Trenton)	3,524	154,542	55,907
" " " South Amboy	16,483	270,810	93, 80
Shipments at Coal Port (Trenton)	8,192	153,062	53,019
" South Amboy	12,979	291,165	150,561

Receipts of Coal at Boston, for week ending Aug. 18, and years from September 1st, 1874 and 1875.

From	Week. Tons.	Previously. 1876. Tons.	1875. Tons.
Alexandria and Georgetown	4,215	83,788	106,714
Philadelphia	20,053	616,153	493,827
Baltimore	7,532	138,755	166,797
Other places	7,355	285,690	249,139
Great Britain	—	4,722	2,784
Nova Scotia	994	22,616	28,583

The Production of Bituminous Coal for the week ending Aug. 19, was as follows:

Tons of 2,000 lb., except where otherwise designated.

	Week, Tons.	Year, Tons.
Cumberland Region, Md.		
Tons of 2,240 lb	41,530	1,088,774
Barclay Region, Pa.		
Barclay RR., tons of 2240 lb	6,584	206,305
Broad Top Region, Pa.		
Huntingdon and Broad Top RR	2,612	100,013
*East Broad Top	1,561	44 875
Clearfield Region, Pa.		
*Snow Shoe	776	33,783
*Tyrone and Clearfield	28,685	720,035
Allegheny Region, Pa.		
*Pennsylvania RR	4,400	131,606
Pittsburgh Region, Pa.		
*West Penn. RR	3.965	125.670
*Southwest Penn. RR	873	37,251
*Penn. & Westmoreland gas coal, Pa. RR.	17,890	486,087
*Pennsylvania RR	797	163,639

* For the week ending Aug. 14.

The Production of Coke for the week ending Aug. 14.

Tons of 2000 lb.	Week. Tons.	Year. Tons.
West Penn. RR	1,167	29,726
Southwest Penn. RR	11,313	316,069
Penn. & Westmoreland Region, Penn. RR.	1,355	30,347
Pittsburgh, Penn. RR	3,377	109,5 9
Total	17,212	485,671

COAL TRADE REVIEW.

[NEW YORK, FRIDAY EVENING, Aug. 25, 1876.

Anthracite.

ON Tuesday a resolution was passed dissolving the Combination, and condemning the Lehigh Valley Railroad Company for its non-compliance with the programme as laid down by the Board of Control. It is well that they settled upon one man, and that one Judge ASA PACKER, as the party to condemn, for had all the evidence of evasion of the spirit as well as the letter of the agreement been brought forward, there would have been so much condemnation necessary, that it would probably have been neglected entirely.

At first it was supposed by some that the announcement of the disorganization of the Combination, and the further announcement of an auction sale of 500,000 tons to take place next Tuesday, were simply moves to coerce the Lehigh Valley Railroad Company into compliance with the programme. It is now believed, however, that the disruption is complete and irreparable. We are strengthened in this belief by interviews we have had with many of the more influential representatives of the mining interest. We find a large proportion of those interested in the business believe the disorganization of the Combination will ultimately be a good thing for the trade; although its first effects may be hard to bear. Now, that the break has occurred, they will use their influence to prevent a reorganization.

It is quite evident that nothing is to be gained by a general war, except it be that in time it would so weaken some of the companies as to bring on financial embarrassments which might retire them from the field as producers for a certain time.

If coal be sold f.o.b. at Perth Amboy at an average of $4 per ton, there will still be a little profit left the Lehigh operators, even though the existing charges for transportation from Penn Haven to Amboy (which are 40 per cent. of the tide-water selling price) should be continued. At a meeting of the Lehigh Exchange held on Wednesday, Messrs. E B. COXE, A. PARDEE, and G. L. STOUT were appointed a committee to call upon Judge PACKER for the purpose of inducing him to reduce the percentage of freight upon the selling price of coal, from 40 to 30 per cent. If this should be conceded, there would be a profit to the mining companies, even though the selling prices might not average over $3.50 at Perth Amboy, while if wages should be reduced 25 per cent., which, with steady work, would still leave very liberal wages, as compared with other industries, even a lower figure could be accepted with profit. It is quite evident that such figures as these, if continued for a great length of time, would be ruinous to more than one of the companies that have large interest accounts to provide for; and it is therefore probable that higher rates will soon prevail.

Our latest advices are that Mr. PARDEE has ordered the closing of all the Hazleton collieries, which would indicate a disinclination on the part of Judge PACKER to reduce tolls. This measure will soon bring the Lehigh Valley to terms, and we may confidently anticipate an acquiescence in the inevitable reduction in freights by that company. Other industries manage to exist without the assistance of a combination, and the anthracite trade must learn to do the same.

The great sensation of the week, after the failure of the Combination has been the announcement of a sale at auction on account of four of the companies, of 500,000 tons of coal, and upon the results of this sale will be based the business of September at least. It is believed that this quantity of coal cannot be sold at anything but ruinous prices, and some suppose, though we think unjustly, that the "Peter Funk" system will be adopted. If such should be the case it cannot pass detection, for this sale will receive a more thorough analysis than any that has ever taken place in this city.

The following is a sample of circular announcing sale:

PHILADELPHIA, August 23d, 1876.

The Philadelphia & Reading Coal and Iron Company will sell at public auction, by Messrs. JOHN H. DRAPER & Co., auctioneers, at the salesroom of the Delaware, Lackawanna and Western Railroad Company, No. 26 Exchange Place, corner of William Street, New York, on Tuesday, the 29th day of August, inst., at 12 o'clock, noon, 200,000 tons of Schuylkill white ash coal of the usual sizes, deliverable 75,000 tons, f. o. b. (to boats and barges only) at Williamsburg, New York Harbor, as follows:

5,000 tons broken coal,
25,000 " egg "
35,000 " stove "
10 000 " chestnut "

and 125,000 tons f. o. b. at Port Richmond, Philadelphia, as follows:

10,000 tons steamboat coal,
10,000 " broken "
35,000 " egg "
55,000 " stove "
15,000 " chestnut "

Terms and conditions of this sale as follows:

1. The sale will be positive to the highest bidder, of every lot put up, no bids whatever being made, either directly or indirectly, for account of the company.

2. Fifty cents per ton, in City Bankable Funds, to be deposited on the day of sale, as a security for the fulfilment of the contract by the purchaser, and the balance to be paid within ten days thereafter, at the office of the company, when the order for the delivery of the coal will be given. The coal to be taken away during the month of September, 1876. Should the purchaser fail to take it away within the month, the company may, at their option, at any time thereafter discontinue further deliveries, and retain the fifty cents per ton deposited on the day of sale; or should the company elect so to do, they may re-sell the coal either at public sale or otherwise for account of such defaulting purchaser, who shall pay to the Company any deficiency caused by the coal being sold at a price less than that originally agreed to be paid.

3. The sizes of the coal are designated by the names known in the company's business, which are always referred to and used in selling, or stating prices.

4. Captains of boats or vessels going to Williamsburg or Port Richmond for cargoes must carry with them an order from the Company.

5. Captains are required to report their boats or vessels to the Superintendent at Williamsburg, or Port Richmond on their arrival, and they will be loaded in turn on taking the berth assigned to them. Exertions will be made to give prompt dispatch but the company will not be liable for demurrage, nor for any consequences attending unavoidable delay.

6. Bills of Lading, or other regular testimony of shipment, to be proof of delivery, both as regards time and quantity.

7. Coal delivered on board of vessels, will be thereafter in all respects, at the risk of the purchaser.

8. The coal now sold will be carefully weighed by competent and disinterested weighers at the time of shipment. Invoices and bills of lading will be made in conformity with such weight, which shall be conclusive to purchasers, and no allowances will be made therefrom for short deliveries at the place of destination.

9. Purchasers of coal will not be allowed to transfer their contracts to others, without the consent of the company in writing.

10. If at any time the business of the company is so interrupted by storms, floods, breaks, accidents, combinations, turnouts or strikes among miners or other employees (even though such combinations, turnouts, and strikes are caused by a reduction of wages made by said company), or by any other occurrence whatsoever, as to materially decrease the quantity of coal which the company would otherwise have been able to obtain and deliver during the month in which the coal now sold is deliverable, the company will not hold itself liable for, or pay any damages sustained by reason of the non-delivery of the coal now sold, or of any portion the eof, although a portion of the coal that is received during said month may, in the usual course of the company's coal sales and business, be disposed of otherwise than in the fulfillment of the contracts made by this sale. Nor will the company, in case the coal now sold is not delivered, undertake a pro rata distribution among the respective purchasers of what is delivered; but in all cases of non-delivery from any of the above causes, the money paid will be promptly refunded.

11. The officers of the company, when requested by purchasers, will use their best exertions to procure vessels for the transportation of coal; but, as this will be done without charge, the company must be absolved from all responsibility in connection therewith.

FRANKLIN B. GOWEN, Pres't.

The Delaware and Hudson Canal Company announces that it will sell at the same time, under similar conditions, 5,000 tons of steamer lump, 40,000 tons of grate, 25,000 tons of egg, and 40,000 tons of stove—110,000 tons in all. The Pennsylvania Coal Company announces 15,000 tons of lump, 5,000 tons of steamer, 20,000 tons of grate, 7,000 tons of egg, 25,000 tons of stove, and 8,000 tons of chestnut, or, in all, 70 000 tons, while the Delaware, Lackawanna and Western Railroad Company simply announces that it will sell 110,000 tons of coal; the proportion of sizes are not given.

Immediately upon the announcement of the dis uption of the Combination, the production of coal was suspended at the mines of nearly all the small companies and individual operators. This class of producers will not name prices until some arrangement has been made relative to freights.

The only prices that have been made since Tuesday have been some temporary ones named by the Delaware and Hudson Canal Company, as follows: Lump, $3.60; steamer, $3.65; broken, $3 70; egg, $3.80; stove, $4.30; and chestnut, $4.20. It is generally believed that these rates will not be reached at the Auction Sale on Tuesday next.

Coal dealers have been requested by the companies to send in a statement of stocks of coal held by them, and to present, for adjustment, their claims arising from purchases made under the representation that prices would be maintained throughout the year. No promises are made by the companies, though there can be no doubt that they will treat their customers in a manner just and honorable in all respects.

Reductions have already begun in retail prices. Pittston coal, in yard, is quoted as follows: Egg and grate, $4.70; stove, $5; and chestnut, $4.30, or a reduction of $1 per ton all round.

There has been no change in vessel freights, although captains are anticipating an advance in rates after the auction sale.

Bituminous.

Last week the Clearfield Region was working to its utmost capacity, while the Cumberland produced only about 9,000 less than during the corresponding week of last year. At the present time the producers in this trade hardly know where they stand, although they acknowledge that they must lose a considerable miscellaneous trade, unless they can get large conces-

sions in freights and wages. The break in the Combination will be a great help in removing the abuse of exorbitant charges of freights in the Cumberland Region. We note a sale of 1,000 tons of Block House coal for gas purposes, at $4.75 currency, at New York.

A decision has just been filed in the case of the State of Maryland vs. the Consolidation Coal Company, dismissing the application of the Attorney General for a forfeiture of the company's charter. This decision, however, is not conclusive as to the validity of the transfer of the Cumberland and Pennsylvania Railroad Co. While affirming the right of the Consolidated Coal Company to purchase the road, the case now decided was not broad enough to include the question of the validity of the sale through the right of the Cumberland and Pennsylvania Rail oad Co. to sell the road in the absence of legislative authority. This can only be tested in the case of the American Coal Co., wherein both parties to the sale are defendants, and which will be tried and determined in September. The Consolidation Coal Co. temporarily continues to operate under a quasi charter, but its authority to impose tolls upon the Cumberland Coal Companies, that, to say the least, are grossly exorbitant, has yet to be decided.

Coal Trade of Philadelphia.

PHILADELPHIA, August 24, 1876.

From our Special Correspondent.

There is no coal trade here at present. Everything is confusion, and rumors of all kinds circulate. New prices will be announced next Wednesday, after the Auction Sale, and every buyer is waiting for it.

The rates of freights are naturally unsettled, and there is very little shipping.

Wholesale Prices of Bituminous Coal.

Domestic Gas Coals.

Per ton of 2240 lb.	At the Shipping Ports.	Alongside in New York.
Westmoreland and Penn. at Greenwich,		
Philadelphia	$4 70	$6 00
" " at S. Amboy	5 50	6 00
Red Bank Cannel Pa. at Philadelphia	8 00	8 50
" " South Amboy	8 50	....
" Orrel	6 00	6 50
Youghiogheny, Waverly Co., at Balt	4 25	5 75
Despard, West Va.	4 50	6 00
Murphy Run, West Va., at Baltimore	4 50	5 85
Fairmount, West Va., " "	4 40	5 70
Newburgh Orrel, Md. " "	4 50	6 00
Canelton Cannel, W. Va	....	10 00
" Splint, " at Richmond.	4 50	6 00
" Gas Coal at Richmond	4 00	5 50
Peytona Cannel, W. Va at Richmond	....	10 00

Manufacturing and Steam Coals.

Cumberland at Georgetown and Alexandria, Va	3 50@3 75	4 90
Cumberland, at Baltimore	3 65@3 80	5 10
Clearfield f.o.b. Canton, Baltimore	3 75@....	5 25

Rockhill Semi-Bituminous and Broad Top, at the mine, per 2,000 lb., 95, f. o. b. Greenwich, Philadelphia, per 2240 lb., $3 60@3 95, according to destination; at South Amboy, N.J., 4 60; New York, 5 00.

Clearfield and Allegheny, "Kittanning," "Sterling," "Sonman," and "Eureka," at the mines, per 2000 lb., 95; at Greenwich, Phil., per 2240 lb., 3 75@4 25, according to destination; f.o.b. South Amboy, N. J., 4 75; New York, 5 25.

Foreign Gas Coals.

	Sterling.	Am. cur'cy,
Newcastle, at Newcastle-on-Tyne	9/6@11/	6 50@ 7 00
Liverpool House Orrel, at Liverpool	26/	13 00
Iuce Hall Cannel "	42/	18 00
" Gas Cannel "	28/	13@14
Scotch Gas Cannel, at Glasgow, nominal,	25/	7 50
	Gold.	
Block House, at Cow Bay, N. S	2 00	4 75
Caledonia, at Port Caledonia	1 50	4 25
Glace Bay, at Glace Bay	1 50	4 25
Lingan, at Lingan Bay	1 75	....
Sydney, International and Reserve mines, at Sydney	2 00	5 50
Pictou, Albion & Vale mines, at Pictou.	2 25	5 75

Retail Prices in New York.

Bituminous.

Liverpool House Orrel, delivered, per ton of 2000 lb	$18 00
Liverpool House Cannel " " " "	22 00
American " " " "	13 00
Canneltон splint, " " " "	7 50
Canneltон Block, " " " "	7 50
American Orrel " " " "	11@14
Red Bank Cannel " " " "	10 00
Cumberland " " " "	7 00

Baltimore, Md. Aug. 22, 1876.

Reported by our Special Correspondent.

ANTHRACITE.

Wholesale or Trade Prices per 2240 lb.

Wilkes-Barre "Lee" or "Diamond," Pittston and Plymouth. White ash.	In cars at depot.	By boats afloat.
Lump and steamboat	$4 87	$4 72
Broken	5 25	5 10
Egg	5 35	5 20
Stove	5 76	5 61
Nut	4 91	4 76
Shamokin, (red or white ash), and "Boston," free burning white ash,		
Egg	5 35	5 20
Stove	5 75	5 60
Lykens Valley, red ash,		
Egg and stove	6 30	5 73

From wharf or yard, wholesale, 50@75c. additional.
By retail, all kinds and sizes, per 2240 lb. $6 50@8 00

BITUMINOUS.

George's Creek, Cumberland f. o. b. at Locust Point	3 75@4 00
West Virginia Gas f. o. b. at Locust Point	4 50
Youghiogheny Gas, f. o. b. at Locust Point	4 50
Swanton	4 00

Boston. Aug. 24, 1876.

By our Special Correspondent.

The recent break in the Coal Combination has caused considerable commotion among the retailers and dealers in coal. The daily papers are discussing the probability of very low prices. Most all the large manufacturing companies have large supplies of bituminous on hand, and any reduction in anthracite will not induce them to purchase.

COAL has had an active yard trade, and a fair inquiry for outside cargoes of small size. The market is full of rumors of the most peculiar character, pointing to individuals insolvent, corporations tottering to ruin, and coals of all classes not having yet seen their worst days. Out of such a state the Combination are still seeking to bring order and harmony. The strike in the gas-coal district is authoritatively denied so far as it relates to the Waverly mines. In Bituminous coals there is very little interest for the moment. Freights are dull and unchanged.—*Commercial Bulletin*, Aug. 19.

Buffalo, N. Y. Aug. 22, 1876.

Reported by LEE & LOOMIS.

Deliv'red at	Elmira. Afloat.	Ithaca. Afloat.	Syracuse. Afloat.	Rochester. afloat	Rochester. ret. del.	Oswego f.o.b.
Grate	$4 05	$4 35	$4 50	$5 20	$6 45	$5 45
Egg	4 05	4 35	4 50	5 20	6 45	5 45
Stove	4 45	4 60	4 95	5 65	6 90	5 90
Nut	4 15	4 50	4 65	5 35	6 60	5 60

Delivered at	Erie. f.o.b.	Buffalo. Afloat.	Buffalo. f.o.b.	Buffalo. ret. del.
Grate	$5 95	$5 45	$5 95	$6 70
Egg	5 95	5 45	5 95	6 70
Stove	6 40	5 90	6 40	7 15
Nut	6 10	5 60	6 10	6 80

Chicago, Ill. Aug. 22, 1876.

No change in prices of coal. Trade quiet.

Cincinnati, O. Aug. 22, 1876.

Reported by our Special Correspondent.

Per ton of 2000 lb.	Bush.	Ton.
Youghiogheny, or Pittsburgh, afloat	7½@8c.	—
Pomeroy coal "	5 @5½c.	—
Kanawha " "	7 c.	—
Cannel coal, according to quality "	10 @16c.	—
The following are the retail prices delivered		
Youghiogheny	10c.	—
Pomeroy	8c.	—
Cannel	15@22c.	—
Kanawha Semi-Cannel	10c.	—
Anthracite, per ton	10 50@11 00	
Coke, at yard	7c.	—
Coke, hard and soft, delivered	9@10c.	—

Cleveland, O. Aug. 22, 1876.

Specially reported by Messrs. BATES & MARTIN.

Herewith find quotations of our market:

Per ton of 2000 lb. f. o. b. vessels.

WHOLESALE.

	For vessels,	On cars.
Youghiogheny Gas Coal	$4 10	$4 00
Cannel	4 25	4 15
Blossburgh	$5 00	$5 00
Briar Hill, Block Coal	3 50	3 25
Straitsville Coal Co., lower vein	2 90	2 90
" " " whole "	2 80	2 80
Hocking Valley	2 90	2 90
Massillon	2 90	3 00
Tuscarawas Valley	2 50	2 50
Columbiana	2 50	2 50

Office of CLEVELAND COAL EXCHANGE,
89 Seneca Street, June 3d, 1876.

PRICES TILL FURTHER NOTICE.

	1 to 10 tons.	10 tons upw'd
Massillon, Brier Hill and Mineral Ridge, lump.	$4 00	$3 75
" " " " " nut	3 75	3 50
Straitsville Lower Vein, Hocking & Shawnee, l'p.	3 50	3 40
" " " " " nut	3 40	3 15
Del Carbo and Rich Hill, lump	3 75	3 40
" " " " nut	3 45	3 15
Columbiana, lump	3 25	3 00
" nut	2 75	2 50
Lackawanna and Wilkesbarre, egg and grate	7 50	7 30
" " stove	8 00	7 75
" " chestnut	7 75	7 50

No Anthracite coal to be sold for future delivery except it be subject to Exchange price at time of delivery.

H. E. CHUBB, Secretary.

Indianapolis, Ind. Aug. 22, 1876.

Specially reported by Messrs. COBB & BRANHAM.

Wholesale on board cars, and retail delivered to consumers. Per ton of 2000 lb., bushel of 70 lb.

BITUMINOUS.

White River, per ton	$2 50	Peytona cannel, per ton.	5 75
Brazil Block, "	2 50	Indiana Cannel	4 50
Highland, grate, "	2 25	Hocking Valley	4 25
Block coal, nut, per car	18 00	Youghiogheny	4 50
Highland " "	18 00	Blossburg (smithing)	6 50
Block Slack "	17 00	Piedmont "	6 50
		Gas coke, per bushel	10

ANTHRACITE (Lackawanna and Wilkes-Barre.)

Broken	$8 35	Nut	8 50
Egg	8 35	Stove	8 75

Lehigh Anthracite.

Broken	9 75	Nut	9 50
Egg	9 75	Stove	10 00

Retail, per bushel, delivered.

Sand Creek	15c.	Block Nut, steam	8
White River	13	" Slack, "	7
Brazil Block	14	Peytona Cannel	28
Highland grate	13	Virginia "	27
Block Nut, domestic use	12	Youghiogheny	20
Highland Nut, "	12	Blossburg	26
" " steam	8	Piedmont	26

GAS COKE (measured.)

Crushed	15c. | Lump 12c.

ANTHRACITE,

Wilkes-Barre and Lackawanna (all sizes)	$9 75 per ton,
Lehigh, retail	$11 50 per ton.

Louisville, Ky. Aug. 22, 1876.

Specially reported by Messrs. BYRNE & SPEED.

Please report our prices as follows:

WHOLESALE.

	per bushel		per bushel
Pittsburgh	12c.	Pine Hill	—
Raymond City	9c.	Kentucky	8c.

RETAIL.

	per bushel		per bushel
Pittsburgh	12c.	Peytona Cannel	20@22c.
Raymond City	11c.	Buckeye "	20c.
Pine Hill	13c.	City-made Coke	10c.
Kentucky	10c.	Anth., per ton, $10 00 to 10 50	
Screened Pittsburgh per load			$3 00
Screened Raymond City			2 75
Pine Hill (Kentucky)			2 75
Cannel			$5 to 5 50

Milwaukee, Wis. Aug. 22, 1876.

Specially reported by Messrs. R. P. ELMORE & Co.

Trade is quiet. Our prices for coal are:

Retail price per ton of 2000 lb.

Lehigh Lump	$ 9 00	Briar Hill, select	$7 50
Lehigh Prepared	9 50	Blossburgh	7 00
Lackawanna (all sizes)	8 50	Cannel	8 00
Pittston	8 50	Pittsburgh	6 50
Scranton	8 50	Steam coal	5 50

New Orleans, La. Aug. 22, 1876.

Reported by C. A. MILTEBERGER & Co.

Pittsburgh coal, retail, per bbl	5 c
" wholesale	30c.
" steamboats, per box	40c.
" to manufacturers	45c.
" shipments, per hhd	$5 25
Anthracite, wholesale, per ton	....
" retail, "	12 50
Virginia Cannel, per bbl	80c.
Scotch " "	80c.
Mt. Carbon, wholesale, per bbl	...
" " retail, "	50c.
St. Bernard wholesale, per bbl	30c.
" retail, "	45c.

Richmond, Va. Aug. 22, 1876.

Specially reported by S. H. HAWES, Dealer in Coal.

Prices are now as follows:

Per ton of 2240 lb., f.o.b.

Kanawha Cannel	$9 00	New River Bituminous,	$4 00
" semi-Cannel	4 00	Clover Hill Coal	3 50
Coalburgh Splint	4 00	James River Bitum	3 30
Lewiston "	4 00	" " Carbonite,	5 00
Kanawha Gas coal	3 90		

Montreal. Aug. 21, 1876.

Specially reported by Messrs. ROBERT C. ADAMS & Co.

Wholesale per ton of 2240 lb.

Scotch Steam	$4 25	Cape Breton Steam	$3 75
Pictou "	4 25	Newcastle Smiths,	5 50

Anthracite at retail, per 2000 lb., delivered.

Egg	$6 25	Chestnut	6 25
Stove	6 75		

Toronto, Ont. Aug. 21, 1876.

Chestnut	$7 25
Stove	7 50
Egg and grate	7 25
Bituminous coal for domestic use	6 00
" " steam	3 50@5 50
Lehigh Lump and broken	7 50
Blossburgh	6 50

Rates of Transportation on Anthracite Coal to Tide Ports.

Lehigh and Wyoming Coals. per ton of 2240 lb.	From Penn Haven.	From Mauch Chunk.	From Hazleton**	From Upper Lehigh.	From Ashley and Sugar Notch.
To ‡ Newark, N. J. (117 miles), via Central Railroad of New Jersey	2 42	2 28	2 84	2 75	2 98
‡ Mauch Chunk, Pa., via Central Railroad of N. J.	14	..	56	47	70
‡ Philipsburg, N. J., (46 miles)	91	77	1 33	1 24	1 47
Elizabeth'p't, (114 m.) Pt. Johns., Hoboken & South Amboy, N. J., shipping and wharfage 35c. add.	2 06	1 92	2 48	2 39	2 62
High Bridge, N. J.	2 40	1 95	2 80	2 54	2 72
Elizabeth, Cranford, Westfield & Elizabethport, for consumption,	2 42	2 28	2 75	2 75	2 98
Jersey City, N. J., (121 miles) and New York, via L. V. RR.	2 42	2 28	2 84	2 75	2 98
Andover, via Delaware, Lackawanna and Western RR	3 30	3 10	3 70	3 69	3 99
§ Trenton Somerset Junction and Greensburg, via P. RR. Belvidere Division	2 65	2 45	3 05	3 04	3 34
Trenton, (97 m.) for shipment, including shipping and wharfage	2 11	1 95	2 45	2 46	2 76

From *Mauch Chunk* to *New York* (121 miles), (towing limits) and Jersey City† via Lehigh Valley RR. $2 14

From *Mauch Chunk* to *Philadelphia* (93 m.) via L. V. and L. and S. RR. and North Penn. RR 1 75

††From *Phillipsburg, N. J.* to *Hoboken* (84 m.) for shipment via Delaware, Lackawanna and Western RR., Mor-

ris and Essex Division 1 10

** Rates on line coal from Hazleton are 10c. per ton above these figures.

‡ The cost of unloading is to be added to these rates. No charge less than 40c. per ton will be made for any distance. Tolls from Mauch Chunk to Phillipsburg for way points will be $1 15 per ton.

§ Twenty cents per ton less when five cars at a time to one party. Provided that where the reduction makes the rate $1 a ton, or less, the rate will be $1.

† Transportation on Coal destined for re-shipment from this point is 20c. less than above rate.

†† The rate for consumption to this point is $1 80.

The distances in the above table are Computed from *Mauch Chunk*. From *Ashley* to *Mauch Chunk* the distance is 51 miles, and from *upper Lehigh*, 33 miles. From *Hazleton* 24 miles, and from *Penh Haven* 8 miles.

From *Wilkes-Barre* to *Perth Amboy* via the Lehigh Valley Railroad Company, the distance is 161 miles, and from *Mauch Chunk* it amounts to 106 miles.

Freights.

Representing the latest actual charters up to Aug. 24, 1876.
Per ton of 2240 lb.

PORTS.	From Philadelphia.	From Baltimore.	From Georgetown.	From Elizabethport, Port Johnson, South Amboy, Hoboken and Weehawken.
Augusta, Me	....	1 90	....	....
Albany	†80	1 50	....	....
Alexandria	....	65	....	....
Amesbury, Mass	....	....	....	....
Bangor, Me	....	1 50	....	90
Bath, Me	1 10@1 15	1 50	1 40	90
Baltimore	....	....	....	....
Boston, Mass	1 15@1 20	1 45	1 50	90
Bridgeport, Ct	†1 00	1 30	....	55
Bristol, R. I.	....	....	....	80
Cambridgeport, Mass.	§1 20@1 30	....	....	90
Derby	....	....	....	....
Dighton	....	....	....	....
East Cambridge	§1 15@1 25	....	....	§90
Fall River	1 15	1 40	1 40	80
Hackensack	*70	....	....	....
Hallowell, Me	....	....	....	....
Hartford	*70	1 90	1 65	90
Hoboken	†70	1 25	1 25	40
Hudson	....	1 40	1 40	....
Jersey City	70	....	1 25	40
Lynn, Mass	....	....	....	† 90
Middletown	....	....	....	80
Mystic	....	....	....	....
Newark	71	1 40	1 30	....
New Bedford	1 15	1 45	1 40	80
Newburyport	1 25	1 60	1 60	1 00
New Haven	1 00	1 30	1 40	55
New London	1 20	1 35	1 40	65
Newport	1 10@1 20	1 45	....	80
New York	70†	1 30	1 25	40
Norfolk	....	62	....	....
Norwalk	1 00	1 40	....	60
Norwich	1 20‡	1 40	1 45	70
Pawtucket	1 25‡	1 60	....	....
Philadelphia	....	80	....	....
Portland	1 15	1 40	1 40	90
Portsmouth, N. H.	1 15@1 20	1 60	1 60	1 00
Providence	1 10@1 15	1 40	1 40	80
Poughkeepsie, N. Y.	....	....	....	....
Rockport	....	....	....	....
Saco	....	....	1 80	....
Sag Harbor	....	1 40	....	1 00
Salem, Mass	1 10@1 15	1 45	1 60	90
Salisbury Pt., Mass.	....	....	....	....
Stamford	....	....	....	60
Stonington	....	....	....	80
Taunton	....	....	....	....
Troy	†80	1 60	....	....
Warren, R. I.	....	....	....	80
Wareham	....	1 50	1 50	....
Washington	....	65	....	....
Weymouth	....	....	....	....
Wilmington, Del	....	82	....	....

* And discharging and towing. † And discharging. ‡ And towing. § 30. per bridge extra.

Freights on Bituminous Coals from the Mines to Tide Water Shipping Ports.

From the Mines to Cumberland and State Line (say an average of 20 miles), the legal charge is 2 cents per ton of 2240 lb. per mile.

From State Line to Amboy (346 miles) $4 per ton of 2000 lb. On coal shipped beyond this point there is a drawback of 75 cents per net ton.

From Cumberland to Baltimore (178 miles) $2.02 per ton of 2240 lb., or $1.80 per net ton (¼ cent per ton per mile for use of hoppers over C. & P. RR.).

From Cumberland to Georgetown (152 miles) by canal, $1.10. Tolls, 46 cents.

From the Mines to Piedmont, 4 cents per ton of 2240 lb. per mile on distances less than 4 miles, and 3 cents per ton per mile on distances over 4 miles, and 2 cents per ton per mile on distances over 10 miles.

From Piedmont to Baltimore (206 miles) $2.34 per ton of 2240 lb.. or $2.08 per net ton.

From Osceola to Greenwich, Phila. (say 248 miles) per T. & C RR, per ton bituminous coal of 2000 lb., less drawback of $1.46. $2.15; rate per gross ton, $2.60.

From Osceola to South Amboy, N.J., (317 miles) per 2000 lb., $4.03, less drawback, $1.03; rate per net ton, $3; add 12 per cent. for gross ton, 36 cents, terminal expenses, shipping, 20 cents; rate per gross ton, $3.56.

IRON MARKET REVIEW.

New York.

FRIDAY EVENING, Aug. 25, 1876.

American Pig.—The rupture in the Anthracite Coal Combination has unsettled buyers, and they are holding back with the belief that lower prices must prevail so soon as a lower price for furnace coal shall be established. The transactions of the week have been entirely in a small way at our quotations, although there is a slight indication that consumers of iron will reap the benefit, in the price of iron, of the concession made to ironmasters in the price of coal. We quote No. 1 foundry at $22; No. 2, $20; and gray forge, $19@$20.

Scotch Pig.—We note sales of 100 tons of Eglinton, and 100 tons of Coltness on private terms. The arrivals are very small, as is also the inquiry. We quote Eglinton at $26.50@$27; Coltness, $28@$29; and Glengarnock, $28.

Rails.—We learn of no business. Prices appear to have a declining tendency, $55 at tide-water being mentioned as a price for a superior make of Bessemer rail.

Old Rails.—There is nothing new to report in these. We continue to quote at $21.50@$22.

Scrap.—We are reported sales of 500 tons of No. 1 wrought scrap on private terms, and 500 tons of car wheels, at $20.

Baltimore. Aug. 23, 1876.

Specially reported by Messrs. R. C. HOFFMAN & Co.

The iron market remains dull, with light sales, at about previous quotations, viz.:

Baltimore Charcoal	$30@35	Anthracite No. 3	$20@21 00
Virginia Charcoal	28@34	Mottled and White	17@19 00
Anthracite No. 1	23@24	Charcoal C.B. Blooms	65@67 00
" No. 2	21@22	Refined Blooms	50@55 00

Boston. Aug. 19, 1876.

PIG is all things to all men. A hopeful foundryman is overrun with statistics of short stock and curtailed production, and is startled with the numericals of how much money is being daily lost in converting ore into pig. A despondent buyer is cheered with the facts that notwithstanding the statistics show the production not more than one-fourth the capacity of the American blast, and that disasters and ruin have been followed by a succession of low prices, he still finds some confidential, generous seller willing to accommodate him with a "little odd lot," the price still lower than previous purchases.

The surface croppings of Pig Iron are of a character to suggest that the bottom has been reached, but, under the actual experiences of the Boston trade for three years, it would be quite fair to assume that the claim was "salted."

One of the prominent interior New York State foundry-men was offered on Tuesday last 120 tons of a leading New York City brand of No. 1 at $22 75 cash, laid down at his depot. This does not seem to be an exceptional opportunity. The pig-iron market is just now in a very sensitive state. A pressure to sell of those who have made advances would force the market sharply lower; if they hold, the prices now current can be made to just refund the costs, and enough furnaces are so situated that they will be glad to take advantage of even this opportunity to run, and so give the trade a supply sufficient to meet the consumption, which is now the average. Of course an increased demand will favor holders.

BAR continues dull, with prices ranging in an irregular way from $49 to $54 for refined. The market is again working scant of special sizes, but there is no disposition to order. A canvass by a Pittsburg and a couple of Ohio mills has been made, but their lowest point was 2c, with an 18c freight, which was not low enough to tempt business. Common iron is very weak, as low as $40 having bought, and on a very respectable schedule at that.—*Commercial Bulletin.*

Chattanooga, Tenn. Aug. 22, 1876.

Specially reported by J. F. JAMES. pig iron broker, etc., 233 Market Street.

The demand for mill iron for the week still continues. Considerable large sales have been made ahead of arrivals, of course, in the continued embarrassed condition of most of our Southern furnaces, contracts being made subject to the arrival from the furnaces. Low prices are still the order of the day. Foundry irons dull, demand poor, and supply limited.

The usual four months time is given on quotations below:

Tenn. Ala. and Ga. Charcoal, No. 1 foundry	$21@	22
" " " " No. 2 foundry	20@	21
" " " " gray forge	17@	18
" and Georgia coke, No. 1 foundry	18@	19
" " " No. 2 foundry	17@	18
" " " " gray forge	15@	16
White and Mottled	14@	—
Tennessee and Georgia cold-blast car wheel	23@	24
Alabama " "	23@	24
Old Rails	cash	22 00
Cast Scrap	"	12
Wrought Scrap	" 18@	20

Cincinnati. Aug. 22, 1876.

Specially reported by Messrs. TRABER & AUBERT, commission merchants for the sale of pig iron, blooms, ore, etc.

We have had a very fair demand for pig iron during the past week, and prices are somewhat firmer. We quote:

CHARCOAL.

Hanging Rock, No. 1 Foundry	$24 00@25 00	—4 mo
" No 2, "	23 00@	—4 mos
" Mill	20 00@21 00	—4 mo
Tennessee, No. 1, Foundry	23 00@	—4 mo
Tennessee, No. 2, "	22 00@	—4 mo
" Mill	20 00@	—4 mos
Missouri, No. 1, Foundry	@	—4 mos

STONE COAL.

Ohio, No. 1, Foundry	22 00@22 50	—4 mos
" No. 2, "	20 50@21 00	—4 mos
Ohio Mill	19 00@19 50	—4 mos
Missouri, No. 1 Foundry	25 00@	—4 mos
" No. 2, "	24 00@	—4 mos
" Mill	23 00@	—4 mos

CAR-WHEEL.

Hanging Rock, C. B	40 00@45 00	—4 mos
Tennessee "	26 00@32 00	—4 mos
Missouri "	33 00@35 00	—4 mos
Alabama "	26 00@32 00	—4 mos

BLOOMS.

Charcoal	60 00@ 75 00	—cash

SCRAP IRON.

Cast	50c.@ 85	—cash
Wrought	1 00@1 40	—cash

Cleveland, Ohio. Aug. 22, 1876.

Messrs. C. E. BINGHAM & Co., quote as follows:

Per gross ton, on four months' time. Subject to change in market. Discount for cash 4 per cent.

FOUNDRY IRON.

No. 1, Lake Superior Charcoal	27 00@	
No. 2, " " "	26 00@	
No. 1, Anthracite	25 00@	
No 2, "	23 00@	
No. 1, Bituminous	24 50@	
No. 2, "	22 50@	
American Scotch, No. 1, Cherry Valley	@	
" " B—1, " "	@	
" " No. 2, " "	@	
No. 1, Massillon	26 00@	
B—1, "	24 00@	
No. 2, "	22 00@	

CAR WHEEL AND MALLEABLE IRON.

No. 3 Lake Superior Charcoal	27 50@	
No. 4 " " "	27 50@	
Nos. 5 and 6 "	27 00@	

BESSEMER IRON.

Nos. 1 and 2 Lake Superior Charcoal	27 00@	

FORGE IRON.

No. 1, Gray	22 00@	
White and Mottled	20 00@	

Louisville. Aug. 22, 1876.

Specially reported by Messrs. GEORGE H. HULL & Co.

The market continues firm for all grades of iron, with only moderate sales.

The usual time, four months, is given on quotations below:

HOT BLAST—CHARCOAL.

No. 1 Foundry, from Hanging Rock Ores	$23 00@25 00	
No. 2 " " "	22 00@23 00	
No. 1, Mill, from " " "	20 00@21 00	
No. 1, Foundry, from Alabama, Georgia and Tennessee ores	22 00@23 00	
No. 2, Foundry, from Ala., Geor'a and Tenn. ores	21 00@22 00	
No. 1, Mill, from " " " " "	20 00@21 00	

HOT BLAST—STONE COAL AND COKE.

No. 1, Foundry, from Hanging Rock Ores	22 00@23 00	
No. 2, " " " " "	21 00@22 00	
No. 1, Mill, " " " " "	19 00@21 00	
No. 1, Foundry, from Ala. Ga. and Tenn. Ores	22 00@23 00	
No. 2, " " " " "	20 00@21 00	
No. 1, Mill, " " " " "	19 00@21 00	
No. 1 Foundry, from Missouri Ores	— @ —	
No. 2 " " " "	— @ —	
No. 1 Mill, from Missouri Ores	24 00@25 00	

COLD BLAST—CHARCOAL.

Car Wheel from Hanging Rock Ores	35 00@45 00	
" " Tennessee "	28 00@30 00	
" " Alabama and Georgia Ores	28 00@40 00	
" " Kentucky Ores	28 00@45 00	

Milwaukee. Aug. 22, 1876.

Iron remains much the same—sales small.

per ton of 2,240 lb.

Frankfort L. S. Charcoal, No. 1	$28 00	
" " " No. 2	27 00	
" " " No. 3, 4 & 5	25 00	
" " " No. 6	25 00	
Mil. Anthracite L. S., No. 1	27 00	
" " " No. 2	26 00	
Wisconsin Iron, No. 1	26 00	
Mahoning Valley Bit's No. 1	32 00	
" " " No. 2	30 00	

Richmond, Va. Aug. 21, 1876.

Reported by ASA SNYDER, Esq.

The iron market is as dull as ever. Demand light and prices unchanged.

Virginia Cold Blast Charcoal Pig Iron								$27 to	$33
" Warm " " " "								24 to	28
" " " Coke " "							1 X	23 to	24
" " " " " "							2 X	21 to	22
" " " " " "							3	20 to	21
" Anthracite	1 X							— to	—
" "	2 X							— to	—
" "	3							— to	—

St. Louis. Aug. 22, 1876.

Specially reported by Messrs. SPOONER & COLLINS, Commission Agents for all kinds of Iron.

Our market is improving slowly in demand. Prices remain the same, and sales are made only in small lots.

Mo. Stone Coal No. 1 Fy.	$25@26	Massillon iron, A No	1.29@30
" " " 2 "	23@24	" " B "	1.34@—
" " Gray Mill,	22½@23	" " "	2.28@—
" Charcoal No. 1, Fy.	23@24	Cold Bl. Car Wheel, Mo.	30@33
" " " 2, "	22@23	" " " " Tenn.	30@33
" " Gray Mill,	22@23	" " " " Ala.	30@33
Tenn. " No. 1, Fdy	23@24	" " " " H. R.	33@35
" " " 2, "	22@23	Mo. Charcoal Blooms..	50@65
" " Gray Mill	22@23	" Scrap "	45@55
Va. Coke, No. 1, Fdy.	24@25	" " hammered Billets	75@80
" " " 2, "	23@24	Assorted Bar Iron 2 50, 60 days	
" "Gray Mill,	21@23	No. 1 Wrought Scrap 90c. cwt.	
H. R. Char. No. 1, Fdy.	25@26	Heavy cast " "	70 "
" " " 2, "	24@25	Light " "	50
" " Gray Mill,	24@25		

Montreal. Aug. 19, 1876.

We continue to quote: Pig iron, Eglinton and Clyde, $18@19.00; Carnbroe $19 00@20 00; American $21@23; Summerlee and Calder $19@20; Langloan and Gartsherrie $20@21; Coltness $20.50@21.00; Hematite $26@27. Bar, per 100 lb., Scotch and Staffordshire, $2.00@2.15; best do., $2.30@2.35. Swedes and Norway $4.75@5.50; Low Moor and Bowling, $6.50@7.—*Monetary Times.*

METALS.

NEW YORK, FRIDAY EVENING, Aug. 25, 1876.

The business of the week has been centered upon copper and lead, with a weakness in prices all around.

Gold Coin.—During the week under review, gold has ranged from 110¾ to 111, and closed at 111.

Bullion.—Silver is quoted at 113, gold, per oz. in this city, while the London market is quoted strong at 52d. San Francisco quotes at 14⅛ per cent. discount. Gold bars are quoted at par to ¼ per cent. premium.

Copper.—During the week under review there have been sales to manufacturers, aggregating 3,500,000 lb., at 19c. for spot and delivery up to December. This was not a concerted move on the part of manufacturers, but was the result of one of the companies lowering its price so much so as to attract the attention of a number of manufacturers, who considered the article cheap at the price named. These purchases have so much reduced the inquiry that other mining companies, in their efforts to dispose of their products, are offering at 18⅞@18¾c. This result is contrary to the removal of former large quantities, when the price invariably advanced.

Tin.—Straits in London is quoted at £72 10/ and at Singapore at $21.50. There have been about 1,000 pigs of the various brands sold during the week at the following quotations: Straits, 17c.; L. & F. 17c.; and Banca 20c., prices all gold.

Tin Plates are unchanged in price although weak. There is but very little business doing. We quote as follows, gold, per box: Charcoal tins, $7.25@$7.37½, and ternes, $6.75@$7; coke tins, $6.75@$7, and ternes $5.75@$6.

Lead.—We are reported sales of 500 tons of ordinary domestic on private terms. We quote ordinary domestic at 6.90c. currency, and Missouri soft at 7.05c.@7.10c. currency.

Spelter and Zinc.—Without business, domestic spelter remains unchanged at 7¼@7¼c. currency. Sheet zinc continues quiet at 8⅛c.@8¾c. gold.

Antimony is quiet, but firm at 15¼c.@15¾c. gold.

Quicksilver is quoted in this city at 50c. per lb., in San Francisco at 45c., and in London, per flask, £8.

FINANCIAL.

New York Stocks.

NEW YORK, FRIDAY EVENING, Aug. 25, 1876.

THE dissolution of the Coal Combination on the 22nd inst., brought with it a storm which swept down the coal-carrying roads like the golden grain before an Indian monsoon. The excitement in these amounted almost to a panic. The decline of the list since the announcement was made public, has ranged from 17 to 23 per cent. A number of sales have been made on sellers' options, 1 per cent. below our lowest quotations, leading to the impression that still lower prices are possible. Our weekly record of the quotations show that a gradual depreciation of these securities has been in progress since the 25th of March last, up to which time the prices had been fairly maintained, and as a class, these stocks were, probably, more favorably considered than any, as an investment security, regularly paying 10 per cent. dividends to their holders The aggregate sales for the week amounts to the unprecedented number of nearly 400,000 shares, while some of this stock represents speculative transactions, yet the bulk of it undoubtedly was thrown upon the market by timid holders. The decline in the three leading companies quoted by us has aggregated since the 1st of April, the sum of $31,000,000, equal to about 50 per cent. of their capital stock. On those people of moderate means who are not able to conveniently bear it, the loss from the decline of these stocks will be severely felt. In view of the sharp competition which will undoubtedly be inaugurated for the coal business, now that each company is left to act for itself, it would not be surprising to see some of the weaker companies become absorbed by the stronger ones.

New Jersey Central Railroad.—Nearly 86,000 shares of this stock have changed hands during the week, between 37⅜ and 61, a difference of over 24 per cent., which represents the decline for the week. The market value of the stock of this company as estimated from the closing quotation is $7,600,000, this shows a decline of $13,850,000 in this stock since the 1st of April, equal to nearly 69 per cent.

Delaware, Lackawanna and Western Railroad.—The sales of this stock for the week have reached the unparallelled amount of 303,900 shares. The fluctuations have ranged from 93¾ to 77, a difference of about 17 per cent. On the 25th of March, the stock of this company sold at 120, equal to a market value for the whole capital of $28.200,000, the market value to-day is $18,095,000, a decline of $10,105,000, or about 43 per cent.

Delaware and Hudson Canal Company.—This stock has not been much dealt in, about 7 000 shares represents the sales during the week, the closing quotation of 75, shows a decline of 17½ per cent. The market value of the stock of this company on the 1st of April last, was equal to $18,000,000, to-day it is worth, on the basis of the closing quotations $11,250,000, this represents a decline of $6,750,000, equal to a shrinkage of 45 per cent.

Chesapeake and Ohio Canal.—A meeting was held in Cumberland, Md., on the 15th inst., to consider the question of building a new railroad line to connect the mines of the Cumberland to Westernport or Savage River. Several different routes were advocated. The directors of the canal company were present, and stated that the company would assist in the preliminary surveys. In view of the depressed condition of business, a considerable reduction in the force employed on the canal is to be made September 1.

Green Pond Railroad.—This road was sold at public sale on the 17th inst., to GEORGE H. POTTS, of New York, for $5,000. The sale was made under a decree from the Court of Chancery of New Jersey, in proceedings in bankruptcy. The road is about four miles long, and connects the iron mines of the Green Pond and Tunber Brook Mining Companies with the New Jersey Midland, near Charlotteburg, N. J.

Scioto Valley Coal Branch Railroad. Several lines have been surveyed for this road in the Scioto Valley and it is said that the one which will be adopted leaves the main line at Ashville, O., 21 miles south of Columbus and runs thence west about 10 miles to Haydenville. The best grades found were on this line.

Bonds the dealings in these have amounted to $115,000 the prices without exception ranging lower, the convertible bonds of the Central Railroad of New Jersey selling down to 89.

Auction Sales of Stock and Bonds for the week have been as follows.

Pennsylvania Coal Company. 156 Shares at $235 per share.

Delaware and Hudson Canal Company. $5,000 7 per cent. reg. bonds due in 1877. Interest May and November at 103¾.

Quotations and Sales of Stocks and Bonds.

For the week ending Aug. 25, 1876.

STOCKS.

	Highest	Lowest	Closing	Shares sold.
Pennsylvania Coal Co	—	—	230	—
Consolidation Coal Co	40½	40	40	500
Spring Mt. Coal Co	—	—	*55	—
American Coal Co	—	—	*54	—
Maryland Coal Co	—	—	12	—
Del., Lack., and West. RR. Co.	93¾	77	77	303,901
New Jersey Central RR. Co.	61	37⅞	37⅞	85,784
Delaware and Hudson Canal Co.	92½	75⅜	75⅜	6,812
Quicksilver Mining Co. pref'd	—	—	15	—
" " " Common	13	12	13	155
Mariposa Land & Min. Co. pref'd	—	—	8	—
St. Louis & Iron Mountain RR.	—	—	18	—
Lehigh & Wilkes-Barre Coal Co.	—	—	—	—
Total Shares sold				397,152
Sales for the week previous				45,446
Increase				351,706

* Nominal.

BONDS.

	Inter'st	Sales.	Price.
Del., Lack. & West. 2d M.	M. & S.	.....	.... @109⅜
" " " 7's Con'ble	J. & D.	...	.... @ ....
Cent'l RR. of N.J., 1st M., New	F. & A.	2,000	.... @112½
" " " 1st Cons.	.....	32,000	99 @101½
" " " Convert'le	M. & N.	36,000	89 @ 98
Lehigh & W.-B'e, Con. Guar'd.	.....	10,000	.... @ 86¾
Am. Dock & Imp. Mt. Bonds.	J. & J.	24,000	94 @ 94½
Del. & Hud. Can., 1st M., 1891	.....	.....	.... @111
" " " 1884	.....	.....	.... @ ..
" " " 1877	.....	.....	@103¾
" " " Coup. 7's, 1894	.....	1,000	.... @108½
" " " Reg'd 7's, 1894	.....	.....	.... @ ....
St. L. & Iron Mountain, 1st M	F. & A.	1,000	.... @ 101
" " " 2d M	M. & N	.....	.... @*79
Chesapeake & Ohio 6's, 1st M.	.....	9,000	.... @*27½
" " " Ex. Coupon	.....	.....	.... @ ....
Mariposa Gold Loan con. 7s.	.....	.....	.... @100⅝
Total sales		$115,000	

* Nominal.

Philadelphia Stocks.

PHILADELPHIA, Thursday Evening, August 24, 1876.

THE dealings in this market show increased activity the sales aggregating nearly 87,000 shares. Prices tend lower, and the market is very much unsettled.

Pennsylvania Railroad.—31,316 shares of this stock have changed hands at from 48 to 49¾, closing at the lower figure; this is a decline of 1¼ from the closing price in our last.

Lehigh Valley Railroad.—Stock is lower, the range for the week being between 52 and 56¾, with sales aggregating nearly 3,700 shares, the final quotation showing a decline of 2½.

Reading Railroad.—Nearly 33,000 shares of this stock have changed hands at prices which were about the same as prevailed during the operations of the previous week. It is said that the firmness in this stock is due to orders given by an extensive operator to buy all that is offered at 44 (the lowest price at which it has gone for a long time), and to sell at 44½. As the bulk of the operations have been made at the former price, it is evident that he is loading up very fast.

Lehigh Coal and Navigation Company. This stock is considerably lower the final price showing a decline of 4¼ with a difference of 5 points or 10 per cent. between the extreme quotations of the week. The sales amount to the very large total of 19,000 shares. This company has declared a quarterly dividend of 1½ per cent. or 75c. per share payable Sep. 2d. This is equal to an annual dividend of 6 per cent. instead of 8 per cent as formerly.

Lehigh and Eastern Railroad.—Ground was broken at Matamoros, Pennsylvania, on the 24th inst., for this road which it is stated, will extend one hundred miles and connect with the Erie Railway at Port Jervis, N. Y. The road is to be completed on the 1st of April, 1877.

Bonds do not exhibit any material alteration in the quotations and transaction are very light.

Harrisburg and Lebanon Railroad. It is proposed to build a railroad from Lebanon, Pa, westward to Harrisburg, about 26 miles, the line being parallel and close to that of the Lebanon Valley Branch of the Reading road.

Quotations and Sales of Stocks and Bonds.

For the week ending Aug. 24, 1876.

STOCKS.

	Highest	Lowest	Closing	Shar's
Lehigh Valley RR. Co.	56¾	52	52	3,672
Pennsylvania RR.	49⅝	48	48	31,316
Reading RR.	44¾	44	44	32,863
Lehigh Coal and Nav. Co	39½	34½	34¾	19,070
Penn. Canal	—	—	*9	—
Buck Mountain Coal Co.	—	—	*25	—
Fulton Coal Co.	—	—	*3⅛	—
Locust Mountain Coal Co	—	—	—	—
Westmoreland Coal Co	—	—	85	—
St. Nicholas Coal Co.	—	—	*1	—
Cambria Iron Co.	—	—	16	—
Crane Iron Co.	—	—	*25	—
Emaus Iron Co	—	—	—	—
Pennsylvania Salt Manufact. Co.	—	—	71⅛	—
Total shares sold				86.921
Sales for the week previous				56,369
Increase				30,552

* These quotations are nominal.

BONDS.

	Sales.	Price
H. and B. T. RR. 1st mortgage, 7s.	—	— @107
" " " 2d " "	—	— @102
" " " 3d " cons	—	— @ 43
Lehigh Valley RR. Con. mtg. 6s.	14,000	99⅞@100
" " " 7s, 1910	3,000	— @114
" " " 6s Reg.	—	— @107
" " " 1st M. 6s coup.	3,000	— @106¼
Pennsylvania RR., 1st mtge. 6s.	2,000	— @105
" " " gen. " cou. 1910.	—	— @104½
" " " gen. " 6s, reg.	1,000	— @107½
" " Cons. M. 6s reg.	—	— @ 99⅜
Phil. & Reading RR. 7s '93	—	— @109
" " G. M. 7s, reg.	—	— @106
" " " " 7s cou.	—	— @106
" " new convertible 7s.	2,000	99 @ 99½
" " 6s 1880.	4,000	— @102⅝
" " debenture 6s.	5,700	77 @ 78
Phil. & Reading C. & I. Co. Deb. 7s.	—	— @—
" " Mt. Carmel & L. M. tract.	2,000	— @ 80
Lehigh Coal & Nav. Co., 6s '84.	3,200	102½@103
" " " RR. 6s, '97.	2,000	— @102
" " " 6s, '77.	—	— @ 97
" " " 6s gold loan.	2,000	— @104½
Penn. Canal, 6s	4,000	— @ 72¼
Penn. and N. Y. Canal, 7s	—	— @109
Ches. and Del. Canal, 6s	—	— @ 86
Susquehanna Canal, 6s	6,000	— @ 75
Delaware Division Canal, 6s	—	— @—
Susquehanna Coal Co. 6s	—	— @ 77
Buck. Mount Coal Co. 6s	—	— @—
Penn. Gas Coal Co. 6s	—	— @—
Honeybrook Coal Co. 7s	—	— @—
Total amount of sales	$53,900	

Closing quotations, in the absence of sales, represent the latest prices bid.

Gold and Silver Stocks.

NEW YORK, FRIDAY EVENING, Aug. 25, 1876.

Mining shares continue irregular and with but one or two exceptions the variations in the quotations are not of sufficient importance to call for special comment.

Savage.—A notable decline has occurred in this stock, the quotation being $7 per share lower, equal to a shrinkage of about $800,000, or nearly 40 per cent. of its share capital. Recent information from the mine, says: "The new machinery is not yet ready to start up, and probably will not be much before the first of September. Putting in the new pumps and columns is much slower work than was expected, the repairs to the main shaft being greater than was anticipated when tha

portion of the work was commenced. Everything else is in perfect order for commencing to drain the shaft as soon as the pumps are in place, and the shaft ready."

Alpha Consolidated.—This stock has advanced $11 per share.

Justice has advanced $6 per share. The daily yield of this mine equals 110 tons of ore. The ore breasts look well and are yielding good ore. The Douglas mill is added to the crushing capacities of the mine. On the 800 feet level both cross-cuts Nos. 1 and 2 are showing evident indications of a near approach to the ore vein, and there is now but little doubt that both drifts will strike the same rich ore body found on the levels above. The face of the east cross-cut from the north drift on the 1,000-feet level is in solid quartz of a good character.

Sutro Tunnel.—The total length of this work is 13,980 feet. The material at the face of the header is porphyry and limestone, rather hard, but blasting well, allowing of excellent progress being made.

Consolidated Imperial.—Daily yield, 30 tons of ore. The ore is being crushed as fast as it is ex racted, and is giving good returns. The ore stopes on the 2000-feet level continue both to look well and yield a good quality of ore. The east cross-cut from the bottom of the north winze, below the 2000-feet level, is showing streaks of ore and quartz of a very favorable character. A drift has been started south from the winze. The south drift from the bottom of the south winze on the 2000-feet level, running to connect with the Yellow Jacket, is making steady progress. The new and powerful blowers have arrived, and will be placed in position ready for service at the earliest day possible. The use of these blowers will greatly expedite the prospecting operations at the bottom of the winze, below the 2000-feet level, as well as benefit the ventilation of all the lower levels of the mine. The air in the main incline is being greatly cooled and benefitted by the air connection recently made in the Bullion Mine between the 1400 and 1700-feet levels.

Ophir.—Daily yield, 300 tons of ore, keeping the mills all running up to to their full crushing capacities. The ore breasts throughout the 1600-feet level are yielding the usual quantity of good ore, with every promise of keeping up the same amount for many months yet to come. The east ore vein recently struck, and which we have heretofore described, is showing a steady and favorable improvement on the 1650-feet level. There seems but little doubt now that when the east drifts are extended a sufficient distance on the 1700-feet level they will cut the same vein. The course of this body of ore will carry it nearly 200 feet east of any point yet prospected on the 1700-feet level. The north drift on the 1600-feet level is steadily advancing, the face in porphyry. The west cross-cut 200 feet south of the Mexican line is also steadily advancing. Sinking and raising on the main incline is making excellent progress. The mine is steadily assuming a much better shape for working than it has been in before for years past.

We take the following review of the condition of a number of the principal mines for the week ending the 17th inst. from the *Gold Hill News*.

Belcher is looking better in its southern portion, and Yellow Jacket is about cross-cutting, perhaps to develop a good little bonanza, the "making" of which has been found in the level above. The winze connection in the Bullion Mine with the lower levels gives an important and long-needed ventilation, and good facilities for prospecting and thoroughly opening up the excellent ore developments already found at the lower levels of not only that mine, but those south of it, including the Imperial lower levels. Whether a good bonanza will be eventually opened out in the Mexican and Union Consolidated, remains for time, money and muscle to show, but should one be found there it must evidently belong to a chimney or concentration north of the big Consolidated Virginia and California bonanza, and calculating upon the usual southerly dip of the Comstock chimneys, the head or "making" of it should be in the Sierra Nevada. Considerable of break or interruption in it is caused by the intersection of Cedar Ravine, but it should be found south of it at a considerable depth. At the other extremity of the lode the Justice group of mines is rapidly coming into deserved prominence, owing not only to the splendid ore showing and bullion product of the Justice Mine, but the fine and important ore prospects of the Lady Washington a short distance north. The Gold Canyon extremity of the Comstock is decidedly looking up.

Caledonia Gold and Silver Mining Company (annual report).—During the past year the erection of the new pumping and hoisting machinery at the new shaft has been completed, and the shaft sunk 730 feet to the 1150-feet level. Four 12-inch plunger pumps, and one 12-inch sinking pump have been put in place: bob stations cut at the 400 and 800-feet levels, and the station from the 1,150-feet level now being made. We have also put in and made ready for use a steam winch for handling pumps, etc., in the shaft, capable of handling twenty-five tons at the end of a single line at the depth of 3,000 feet. For the last six months we have had a large body of water to contend with in sinking, and have had to raise with pumps and tanks an average of not less than 400 gallons of water per minute, making sinking much slower than during the first six months. A small engine and set of saws have been put in carpenter shop, and one set of boilers removed from the old shaft, overbanded and put in good order, and set up at the new shaft. At the old shaft the incline was sunk 88 feet, when water compelled us stop sinking on 4th of September, 1875, since which no work has been done at this shaft. I would recommend the machinery at the old work be taken down or stored, the building removed and expense of watchman saved

The following is a statement of receipts and disbursements for the year:

RECEIPTS.

Book account	$2,439 85
Mine account	4,025 41
Premium account	110 00
Capital stock	280,000 00
Expense account	961 00
Swiss American Bank	15,428 83
Total	$302,965 09

DISBURSEMENTS.

Book account	$40,073 25
Mine account	246,037 30
Expense	9,919 32
Legal expenses	2,043 95
Interest account	3,773 50
Exchange account	588 40
Book account	529 37
Total	$302,965 09
Assets	51,635 00
Liabilities	15,965 33

It is rumored that all of the mills, reduction works and furnaces employed on ores from the Bonanza mines are now owned by FLOOD & O'BRIEN, who receive a large royalty from the different companies for the use of the same. All ores, rich or poor, pay the same tax. This firm owns the forests and sawmills which supply timber to the mines, and also the Nevada Flume and the railroads used for transportation, timber, ores, bullion, and supplies to and from the mines.

The American Mining Stock Board, of New York, has been organized. We shall have occasion to refer to it in a subsequent number. At present we refer to its card in our advertising columns.

QUOTATIONS:

	No. of feet on Vein.	No. of shares.	Aug. 18.	Aug 25.
Sierra Nevada	3,300	100,000	$14	$14
Union Consol'd	000	100,000	—*	15
Mexican	600	108,000	34	35
Ophir	675	108,000	51¼	54
California	600	540,000	60	59
Consol'd. Virginia	710	540,000	53	53
Best & Belcher	540	100,800	49	48
Gould & Curry	612	100,800	14	15
Savage	771	112,000	19	12
Hale & Norcross	400	112,000	11	11
Chollar Potosi	1,400	28,000	93	95
Alpha Consol'd	306	30,000	48	59
Imperial Con	468	500,000	5	0
Yellow Jacket	957	120,000	31	34
Kentuck	95	30,000	—*	13
Crown Point	541	100,000	12	12
Belcher	1,040	104,000	23	23
Overman	1,200	38,400	74	75
Caledonia	2,188	100,000	9	8
Justice	2,100	105,000	23	29
Raymond & Ely	5,000	30,000	—*	8
Meadow Valley	4,400	60,000	—*	1
Eureka Consolid	....	50,000	—*	11
Eureka G. V	1,680	20,000	—*	3
Silver Hill	5,400	54,000	—*	9
Julia	3,000	110,000	—*	9

* We have no quotations of these stocks for this date.

INCORPORATIONS.

We note the recent organization of the following mining companies in addition to the announcements in our issue of the 29th ultimo:

Name of Company.	Location.	Cap. Stock.
Shasta Coal Company, Shasta County	California	$5,000,000
Spanish Gold Mining Co., Nevada Co	"	5,000,000
Volcano Gold Gravel Mining Co., Amador Co	"	6,000 000
Gold Stripe Mining Company	"	8,000,000
Skippel Gold Mining Co., Butte Co	"	3,000,000
Salt Creek Ditch and Hydraulic Co., Shasta County	"	5,000,000
South Emigrant M ning Co., Inyo Co	"	10 000,000
Union Petroleum Co., Los Angeles Co	"	5,000,000
Newhall " " "	"	10,000,000
Mariposa Consolidated Gold Mining Company, Mariposa County	"	6,500,000
Charlotte Gold & Silver Min. Co., Inyo Co	"	10,000,000
Great Eastern Gravel Mining Company	"	1,400,000
Custer Gold Mining Co., Mariposa Co	"	3,000,000
St. Patrick Con. Mining Co., Placer Co	"	2,000,000
Pine Log Gold Mining Co., Tuolumne Co	"	3,500,000
La Libertad Mining Co., Stanislaus Co	"	500,000
Kentucky Ridge Mining Co., Nevada Co	"	3,000,000
Manhattan Ore Treating Co	"	5,000,000
Melbourne Mining Co	"	10,000,000
Pyramid Lake Gold & Silver Mining Co	"	10,000,000
Agenda Mining Co., Butte Co	"	10,000,000
Centennial Mining Co, Placer Co	"	1,000,000
Volcano Tunnel Water and Mining Co. Amador County	"	10,000,000
Wash Deep Gravel Gold Mining Co., Trinity Co	"	10,000,000
Palisade Gold Mining Co., Tuolumne Co	"	5,000,000
Rex Montis Mining Co., Inyo Co	"	320,000
Hanover Consolidated Mining Co., San Francisco	"	3,000,000
Jackson Gold & Silver Min. Co., Lyon Co.	Nevada	$10,000,000
South Utah Mining Co., Storey Co	"	2,000,000
Spanish Belle Mining Co., Nye Co	"	7,500,000
Resumption Gold & Silver Mining Co	"	10,000,000
De Haro Mining Co., Storey Co	"	10,000,000
Yolo Mining Co., Storey Co	"	10,000,000
George Douglas Mining Co., Storey Co	"	10,000,000
Mount Hood Mining Co., Storey Co	"	10,000,000
Vancouver Mining Co., Storey Co	"	10,000,000
Sabine Mining Co., Storey Co	"	10,000,000
La Plata Silver Mining Co., Storey Co	"	10,000,000
Towanda Gold & Silver Min. Co. White Pine Co	"	10,000,000
Vermont Consol. Mining Co	"	11,000,000
Lancaster Gold & Silver Mining Co	"	10,000,000
Diamond Gold & Silver Min. Co. Storey Co	"	5,000,000
North Prospect Min Co., Storey Co	"	10,000,000
Gould & Barnhart Silver Mining Co	"	10,000,001
Avery & Crosby Silver Mining Co., Washoe Valley District	"	10 000,000
Oriental Mill and Mining Co	"	10,010,000
Jennie A. & Black Rock Mining Co., White Pine Co	"	10,000,000
Spanish Gold Mining Co	"	5,000,000
Lexington Consol. Mining Co., Gold Hill	"	10,000,000
Crevice Mining Co., East of Gold Hill	"	10,000,000
Ætna Mill and Mining Co., Eagle Ledge, Bradshaw District	Arizona	3,000,000
Merchants and Miners Tunnel Co., Boulder Co	Colorado	5,000,000
Bear River Ditch Co., Grand Co	"	20,000
Caribou Belt Mining Co., Boulder Co	"	1,000,000
Ontario Mining Company	Utah	10,000,000
Racine Lead Mining Co., Newton Co	Missouri	100,000

Copper Stocks.

Specially reported by Messrs. WILSON W. FAY & Co., Bankers and Brokers, Room 7 Traveller Building, 31 State Street, Boston.

BOSTON, THURSDAY EVENING, Aug. 24, 1876.

The copper market has the same old story to tell this week. There is, however, very little stock pressing for sale, and it would be very difficult to buy any of the stocks at their present asking figures, with the slightest degree of activity in the market. Calumet steady and strong at 161. Copper Falls the same as last reported, 3 bid. Duncan Silver a shade lower at 3¼. Franklin stronger, selling yesterday at $12, an advance of $1, settling back again at the close to 11, bid. International Silver strong at 40. National steady at 1¼ bid. Quincy after selling at $40, is in demand again at 41¾. There is some demand for Ridge at 4½.

Taunton Copper Company.—Sales of this stock are reported to us during the week at $360 per share.

DESCRIPTION.	Par Value.	No. of Shares.	CLOSING. Bid.	Asked.
Allouez	$50	20 000	$ 6 00	$ 7 00
Calumet and Hecla	25	80,000	160 75	161 61
Central	25	20,000	30 00	31 00
Copper Falls	50	20,000	3 00	3 25
Dana	25	20,000	8	12½
Franklin	25	20,000	11 00	11 88½
Humboldt	25	20,000	9	12½
Madison	25	20,000	27	30
Mesnard	25	20,000	35	40
Minnesota	25	20,000	1 50	1 75
National	25	20,000	1 25	1 50
Osceola	25	40,000	21 00	22 00
Petherick	25	20,000	—	50
Pewabic	25	20,000	2 75	3 50
Phenix	25	20,000	12 37½	12 75
Quincy	25	20,000	41 75	42 25
Ridge	25	20,000	4 50	5 00
Rockland	25	20,000	25	30
International Silver	20	60,000	40	50
Star	25	20,000	37½	45
Superior	25	20,000	15	12½
Duncan Silver	20	60,000	3 2	3 50

Gas Stocks.

NEW YORK, FRIDAY EVENING, August 25, 1876.

No change is noticeable in the continued inactive condition which has characterized the gas stock market for several weeks past.

Richmond, Staten Island, Gas Company.—46 shares of this stock have changed hands during the week at $97 per share.

Citizen's Gas Company, of Newark, N. J.—We change the quotation of this stock to 90@95.

Laclede Gas Company, St. Louis, Mo.—This stock is quoted at from 100 to 110.

Malden and Melrose, Mass., Gas Company.—Small transactions in this stock is reported to us at $84 per share.

Newtown and Watertown, Mass., Gas Company.—This stock has sold during the week at $120 per share.

Massillon, Ohio, Gas Company.—The rates charged by this company to the city is $3 per 1,000 feet. The Common Council will pay but $2.50 per 1,000 feet and the people are left in darkness.

Globe Gas Light Company.—We note the recent organization of this company in San Francisco, with a capital stock of $1,000,000.

The following list of Companies in New York and vicinity are corrected weekly by GEORGE H PRENTISS, Broker and Dealer in Gas Stocks, No. 30 Broad st., N. Y.

Quotations "bid" and "asked" of New York City and Vicinity Gas Companies are on the $100 of stock and not on one share.

Companies in New York and Vicinity	Cap. Stk.	Par.	last Dividend.	When Paid.	Bid.	Askd.
			pr.c			
Mutual, N. Y	$5,000,000	$ 100	2½	Jan. '76	110	111
" " Bonds	90,000	1,000	3½	Feb. '76	105	
NewYork, "	4,000,000		5	Jan. '76	135	140
Metropol. "	2,500,000	100	5	Mar. '76	150	155
" " Certf.	1,000,000	....	3½	" "	101	102
" " Bonds	500,000	1,000	3½	Jan. "	102	102½
Harlem "	1,850,000	50	4	Feb. '76	115	116
Manhattan "	4,000,000	50	10	July "	240	—
Brooklyn, B'klyn	2,000,000	25	5	June '76	180	190
Nassau "	1,000,000	25	4	Jan. '76	75	75¾
" " Certf.	700,000	1,000	3½	Nov. '76	94	95
People's "	1,000,000	10	3½	Jan. '76	45	50
" " Certf.	300,000	1,000	3½	Jan. '76	80	85
" " Bds	325,000	....	3½	Feb. "		95
Metropol. "	1,000,000	10	3½	Nov. '75	70	75
Wmsburgh "	1,000,000	50	5	Jan. '76	125	130
" " Certf.	1,000,000	....	3½	Jan. "	100	102
Citizen's "	1,200,000	20	2½	Jan. '76	88	90
" " Certf.	320,000	1,000	3½	April "	99	101
J. C. N.J	386,000	20	5	July,'75	160	—
Centl. Westch. N.Y.	466,000	50	4	July. "	95	100
Suburb'n " "	390,000	50				95
† Gold.						

Companies out of Town.—No changes have occurred in the quotations of the out of town companies other than noted above; we refer to our issue of the 29th ult., which contains the list of these.